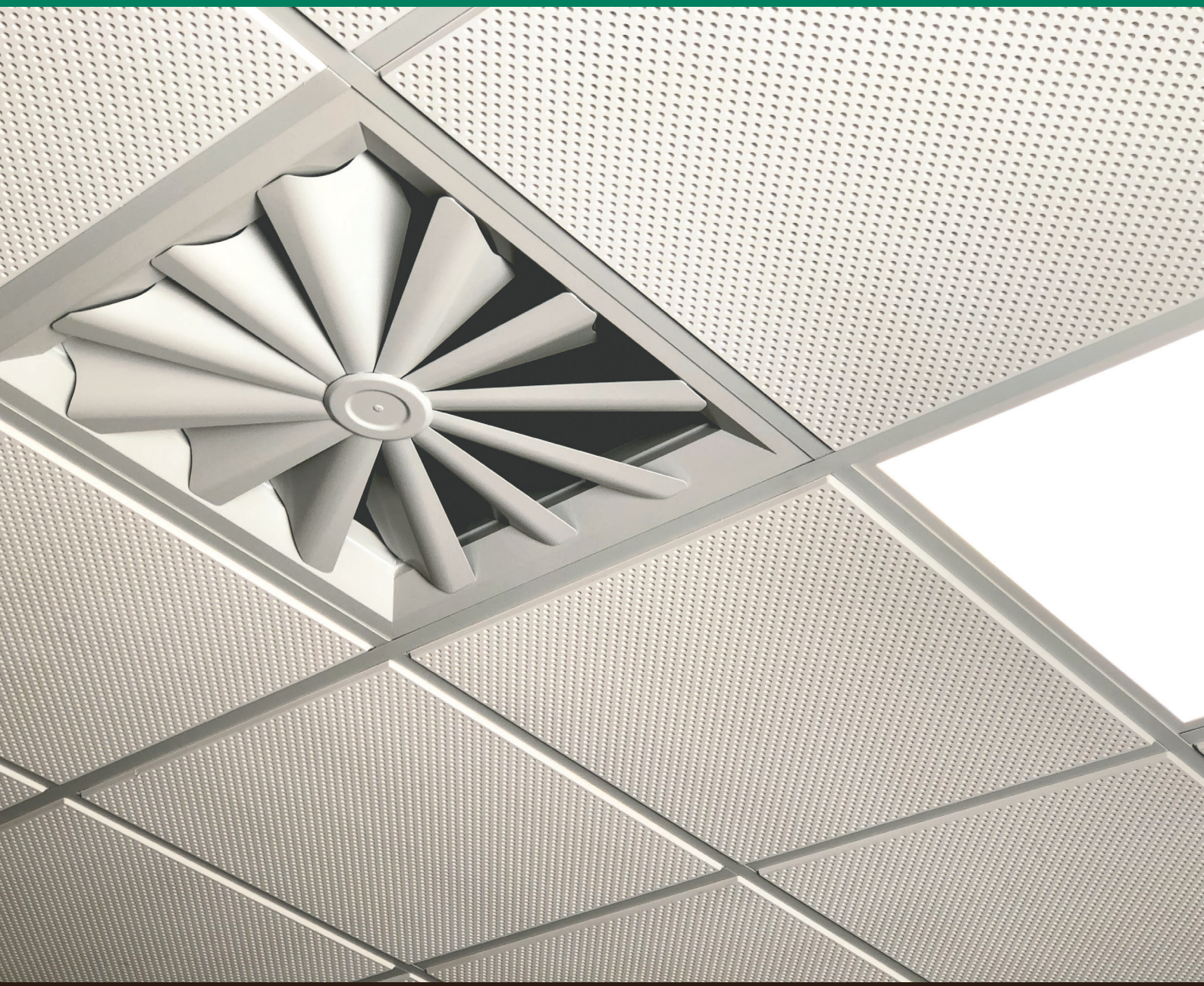
Australian Plaster Acoustics

Quiet Sound – Ultimate Plaster Acoustic Ceiling Tiles



AUSTRALIAN
PLASTER ACOUSTICS
Innovative Sound Solutions

COVER AND THIS PAGE ECOCHECK INSTALLATION

HUMPTY DOO SENIOR SCHOOL

DARWIN NT AUSTRALIA

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SHADEX INSTALLATION

ZUCCOLI PRIMARY SCHOOL
DARWIN NT AUSTRALIA

Quiet Sound ULTIMATE COLLECTION

The **Quiet Sound** Ultimate collection was developed from our *Standard Range of Plaster Acoustic Ceiling Tiles*. It involved major research and development that highlighted the substantial relationship between acoustic performance and the weight of the tiles. As a consequence of research and development, the **Quiet Sound** collection provides:

- New innovative modern designs only achievable from cast plaster
- Exceptionally sharp tile profiles possible only with the use of silicone rubber moulds
- Higher acoustic & sound transmission properties
- Lightweight properties which allow lighter structural ceiling grid
- Easier installation
- Easier packaging & transportation

The **Quiet Sound** consists of perforated ceiling tiles and panels, perfect for acoustic engineers architects and interior designers who are looking for aesthetic designs coupled with high acoustic properties. **Quiet Sound** provides subtle innovative solutions for creating a unique, decorative finish giving many benefits.

KEY SELECTION ATTRIBUTES

- Cost effective ceiling and wall solution
- High-quality product
- Decorative or non-decorative
- High humidity performance. Our acoustic tiles and panel do not sag in humid conditions. They are able to withstand high humidity and temperature from 0° to 80°C
- Dimensional stability up to 95% humidity
- Anti-mould paint applied at the time of manufacture which stops growth of mould (Tiles are pre-painted white)
- Simple installation Plaster Acoustic Tiles.
- Plaster glass panels screw fix to steel or timber battens
- Flush jointing
- High acoustic performance – all products having NRC ranges between 0.70 up to 0.90 NRC
- CAC between 32 to 45 dB for acoustic ceiling tiles
- Reduces noise reverberation
- Prevents dust entering into room space
- Reduces echo
- Able to distinguish between music and speech
- Fire rated to group 1 certification
- High light reflective
- Good R values in plaster acoustic tiles 0.80 thermal resistance
- All products 100% Australian made

All acoustic tests for NRC carried out by RMIT University of Melbourne and CSIRO Melbourne in accordance with ASTM-C423-90A NRC (Noise Reduction Coefficient)

Acoustic tests for CAC (Ceiling Attenuation Class) carried out by Acoustic Laboratories Australia
Pty Ltd in accordance with
ASTM E1414/E1414 M 11A for CAC

All dimensions are in mm and are approximate

APPLICATIONS

- Commercial office buildings
- Show rooms
- Schools and universities
- Restaurants, cafes, food halls
- Retail complexes
- Shopping centres
- Auditoriums and concert halls
- Libraries and galleries
- Cinemas
- Home theatres
- Foyers for public buildings
- Music rooms
- Public Domains
- Health Care Areas

THE ULTIMATE COLLECTION CONSISTS OF

1. Lightweight plaster acoustic ceiling tiles for exposed grid ceiling system

Six modern designs that have excellent NRC and CAC properties, made to suit 600 x 600mm steel or aluminium grid systems.

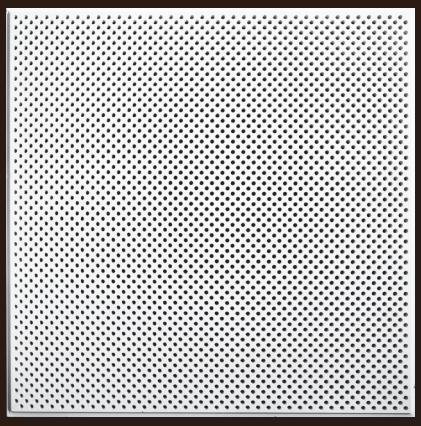
2. Plaster acoustic ceiling tiles for concealed direct fixing

Two striking designs for V-edged finish, giving exceptional NRC and CAC properties. These are made to be directly fixed to furring channels.

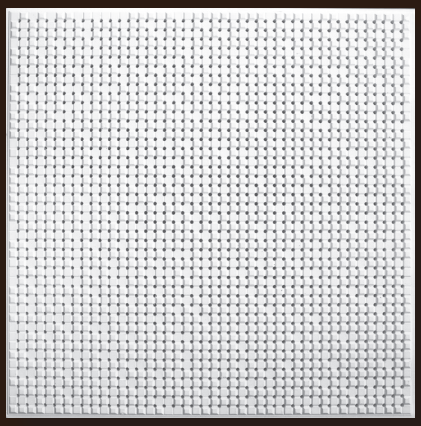
All dimensions are in mm and are approximate

LIGHT WEIGHT PLASTER ACOUSTIC CEILING TILES

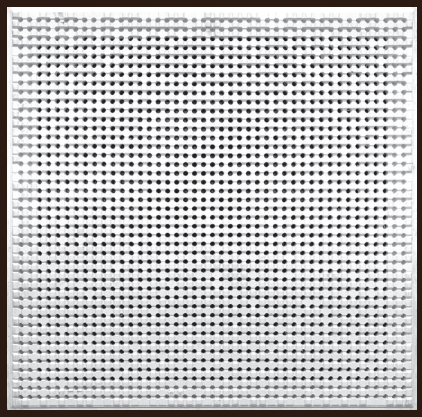
- made from silicon rubber moulds giving a sharp and distinctive attribute



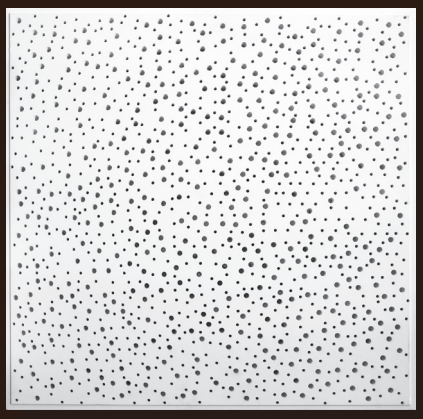
EcoCheck



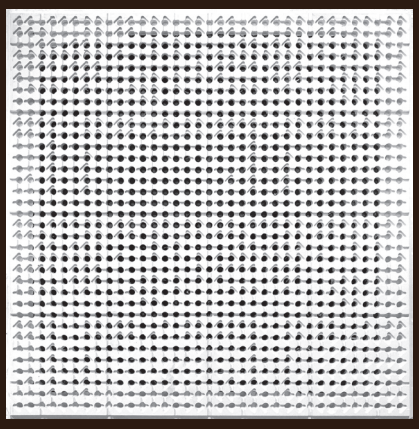
Shadex



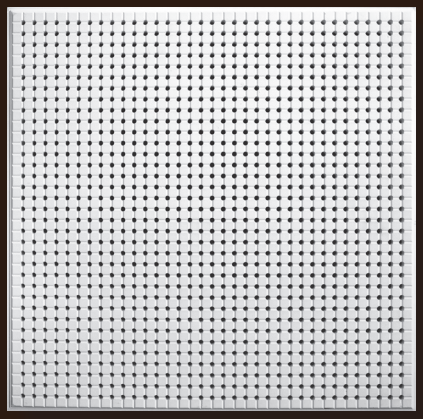
New Shadex



Random Hole



Interface 2020



Hush

All dimensions are in mm and are approximate

LIGHT WEIGHT PLASTER ACOUSTIC CEILING TILES

- **for exposed grid ceiling systems.**

Plaster acoustic ceiling tiles are manufactured from reinforced casting plaster and offer excellent sound absorption, controlled sound transmission and decorative finishes.

The tiles are supplied with an integrated sound absorbent batt inserted during casting and are produced in a range of varying designs. These tiles are pre–painted white.

ACOUSTIC PROPERTIES

These tiles measure 30mm thick, 600 x 600mm with a 20mm thick sound absorbent batt giving a high NRC and CAC value.

ADVANTAGES

1. Dimensionally stable will not warp or buckle
2. Not affected by humidity
3. Fire resistant
4. Acoustic properties
5. Redecoration does not affect the properties
6. Easy removal and replacement
7. Mass 12.2-12.4 kg/m^2

PLASTER ACOUSTIC TILE RANGE :

ECOCHECK
Diamond pattern tile

SHADEX
Multi-level mosaic faced tile| with regular 5mm dia holes spaced 13mm apart

NEW SHADEX
Multi-level mosaic faced tile with regular 7mm dia holes spaced 13mm apart

INTERFACE 2020
Indented faced tile with regular 10mm dia holes

HUSH
Uniform chocolate block pattern tile

RANDOM HOLE
Plain faced tile with Random Hole circular perforations over the entire face

CASE STUDY

Palmerston Police Station, NT
Location: 2 Kettle St, Palmerston City NT,

The new Palmerston Police Station in Darwin will provide upgraded 24-hour Policing capability which includes, administration offices, operational areas, watch house, community hall, and services building and covered parking areas.

Solution

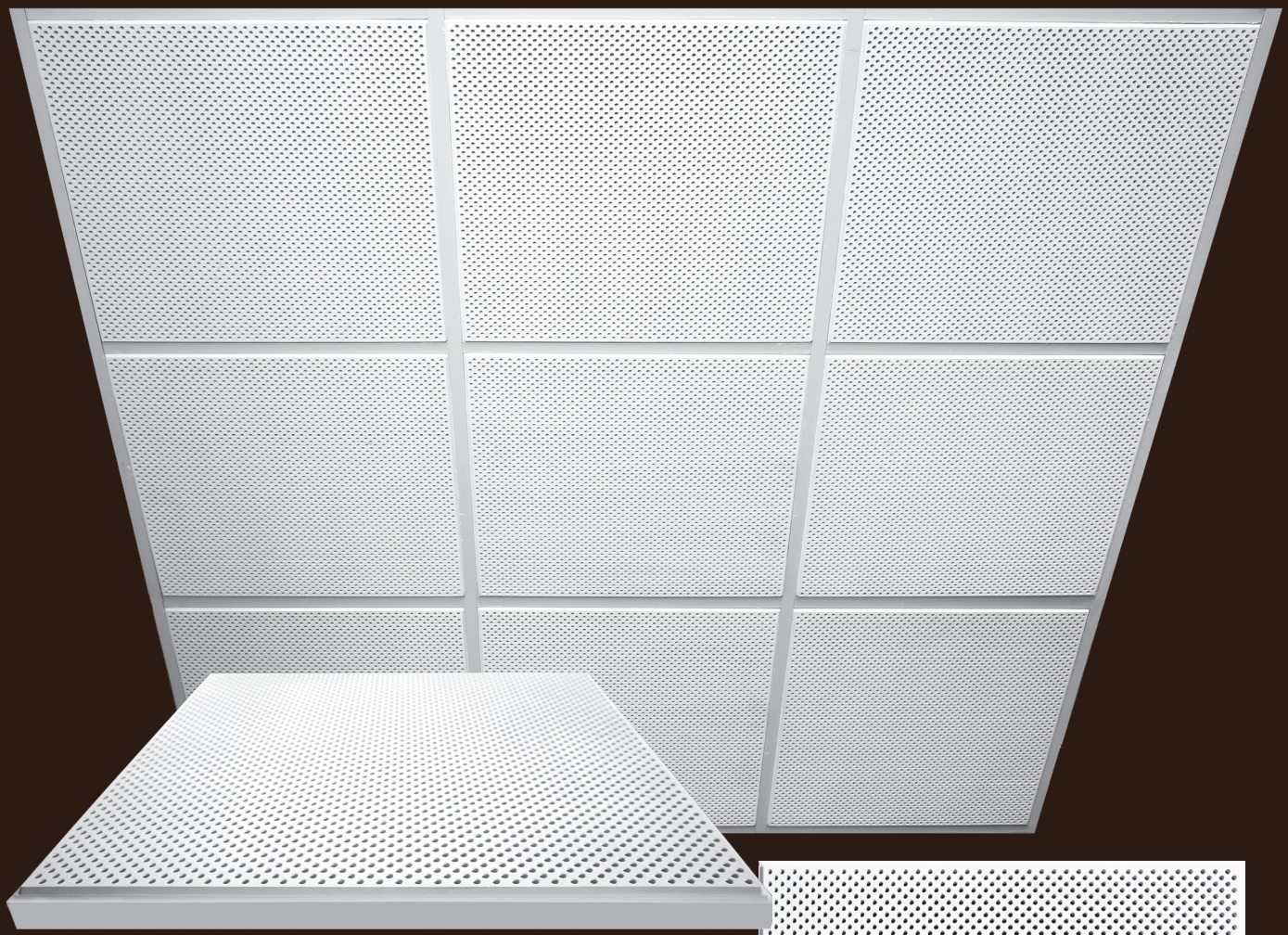
The EcoCheck ceiling tile was selected due to its superior acoustic performance. EcoCheck not only has high sound absorption performance specifications with a NRC value of 0.8 , but it is also coupled with a high CAC of 35Db provides an efficient barrier to airborne sound transmission between adjacent closed offices.

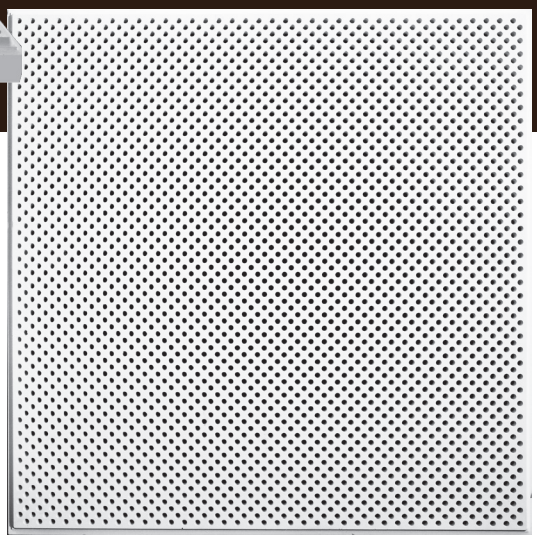
Over four thousand tiles were used in this project and were installed in most areas, including command centre rooms, police records rooms, multiple meeting/ interview rooms and corridors where acoustic consideration was imperative.

ECOCHECK INSTALLATION

PALMERSTON POLICE STATION
DARWIN NT AUSTRALIA

EcoCheck





PROPERTIES

- Bevelled edge.
- Insulation is integrated. Fiberglass insulation batt inserted into tile during manufacture. 32Kg/m^3, 20mm thick Glasswool
- To be used in conjunction with ceiling grid exposed 24mm T Bar steel or aluminium 600 x 600 system.

EcoCheck ACOUSTIC PERFORMANCE AND SPECIFICATION

Open Area	Thickness mm	Size mm	CAC	R Value	NRC	SAA	% Light Reflective	Mass Kg/m^2	Weight per Tile - Kg
21.3%	20	600 x 600	35	0.80	0.80	0.78	0.80	12.20	4.45

All dimensions are in mm and are approximate


SEVEN
TEN
SPLIT
Fairfield Bowling

CASE STUDY

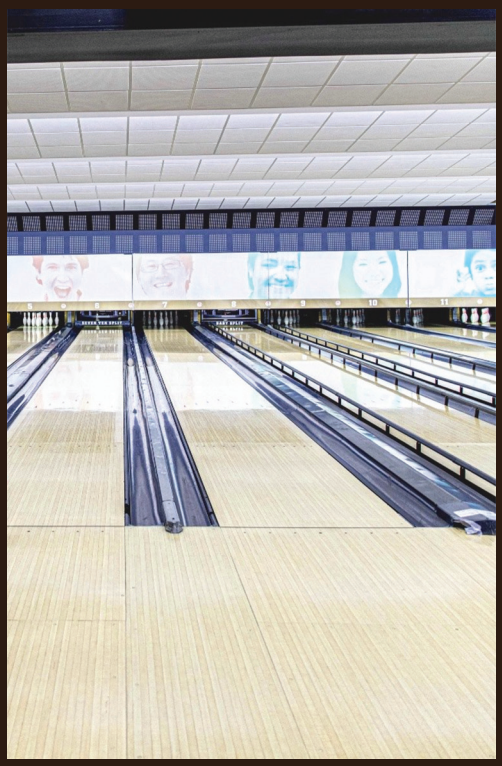
Seven TEN SPLIT Fairfield Bowling Club
Location: 22 railway parade Fairfield NSW

Storm damage had cause existing suspended ceiling tiles to collapse over the bowling alley. It was a good opportunity to replace these tiles with high performance plaster acoustic tiles.

Being a bowling alley, noise reverberation was a substantial factor. Eco Check was recommended for controlling in-room noise.

These tiles had to be installed onto a Rondo Ceiling grid on a staggered angled plane.

The Eco check design offered an attractive ceiling solution with the highest acoustic rating possible to reduce reverberation



All dimensions are in mm and are approximate

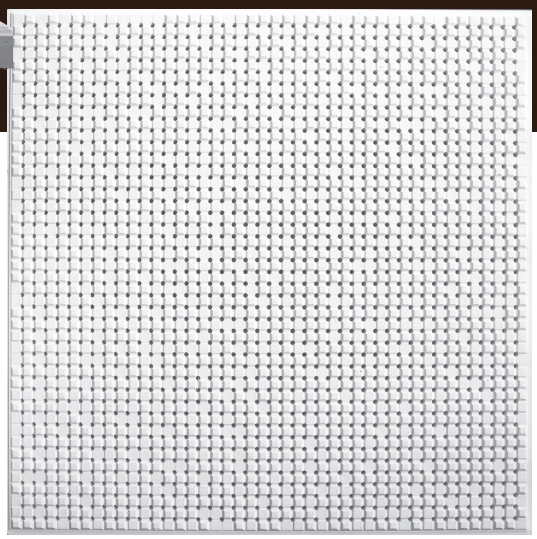
SHADEX INSTALLATION

ZUCCOLI PRIMARY SCHOOL

DARWIN NT AUSTRALIA

All dimensions are in mm and are approximate

Shadex



PROPERTIES

- Bevelled edge.
- Insulation is integrated. Fiberglass insulation batt inserted into tile during manufacture. 32Kg/m^3, 20mm thick Glasswool
- To be used in conjunction with ceiling grid exposed 24mm T Bar steel or aluminium 600 x 600 system.

Shadex ACOUSTIC PERFORMANCE AND SPECIFICATION

Open Area	Thickness mm	Size mm	CAC	R Value	NRC	SAA	% Light Reflective	Mass Kg/m^2	Weight per Tile - Kg
10.1%	30	600 x 600	32	0.80	0.75	0.72	0.80	12.20	4.5

All dimensions are in mm and are approximate

CASE STUDY

Darwin High School NT

Location: Bullocky Point, The Gardens, NT, Australia

The Northern Territory Government recently worked on an extensive project with Australian Plaster Acoustics, to help solve a recurring issue with failing ceiling systems.

This project was considerably large in scale, replacing approximately 3000 square metres of ceilings in the administration building of the high school, all whilst working with a limited time frame during mid-term school holidays.

There was a need to manage the sound reverberation and reduction of noise within the learning environments at Darwin High School, so an acoustic ceiling tile was a necessary inclusion

The Solution

Australian Plaster Acoustics put forward the high quality Shadex option of custom made ceiling tiles - a 600mm x 600mm acoustic bespoke ceiling tile made with Gyprock Casting Plaster – a grit free speciality plaster that produces a strong moulded product with a clean cast face.

Incorporating a 3D grid pattern of tiny square blocks randomly aligned on the tile, Shadex provides a rigid, faceted diamond appearance once installed.

The ceiling tiles created were unique in style, aesthetically pleasing and most importantly, offered excellent sound absorption capabilities.

The Result

The Shadex design offered an attractive ceiling solution with the highest acoustic rating possible to reduce noise transfer and sound reverberation in crucial learning environments. The Northern Territory Government is extremely pleased with the successful outcome and innovative product delivered by Australian Plaster Acoustics, with the refurbished ceiling improving the overall performance of the administration space.

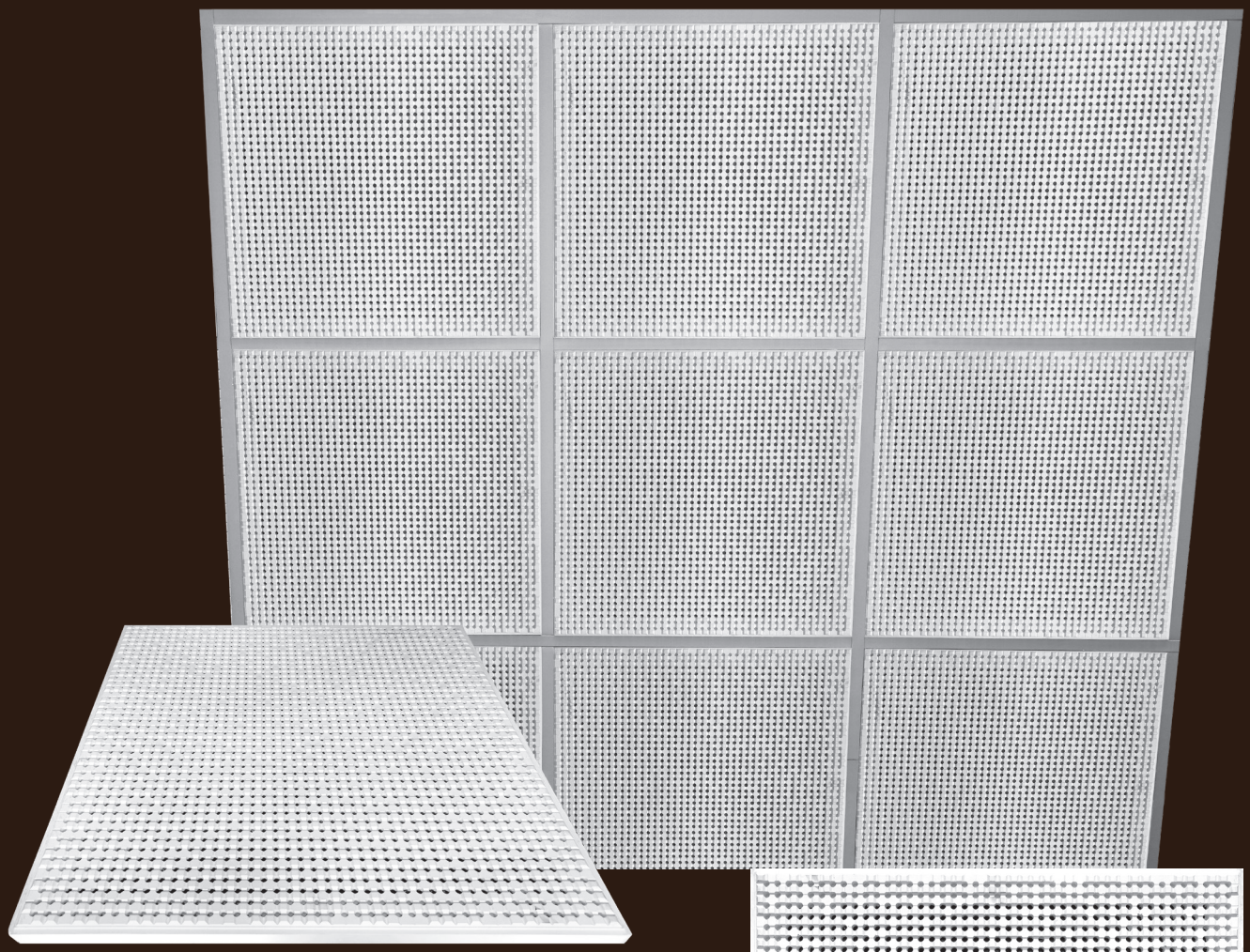
All dimensions are in mm and are approximate

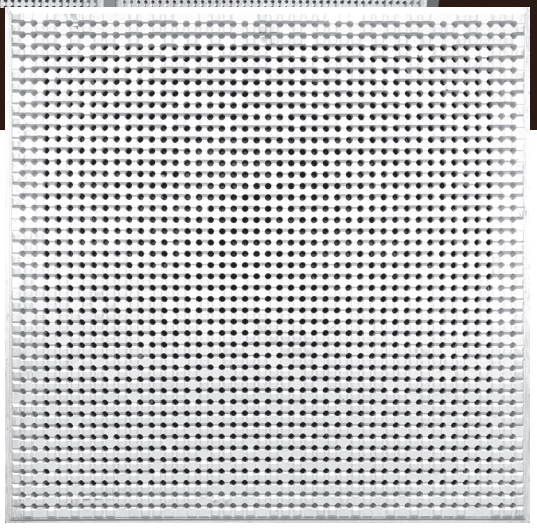
SHADEX INSTALLATION

DARWIN HIGH SCHOOL
NT AUSTRALIA

All dimensions are in mm and are approximate

New Shadex





PROPERTIES

- Bevelled edge.
- Insulation is integrated. Fiberglass insulation batt inserted into tile during manufacture. 32Kg/m^3, 20mm thick Glasswool
- To be used in conjunction with ceiling grid exposed 24mm T Bar steel or aluminium 600 x 600 system.

New Shadex ACOUSTIC PERFORMANCE AND SPECIFICATION

Open Area	Thickness mm	Size mm	CAC	R Value	NRC	SAA	% Light Reflective	Mass Kg/m^2	Weight per Tile - Kg
19.8%	30	600 x 600	38	0.80	0.80	0.81	0.80	12.20	4.5

All dimensions are in mm and are approximate

CASE STUDY

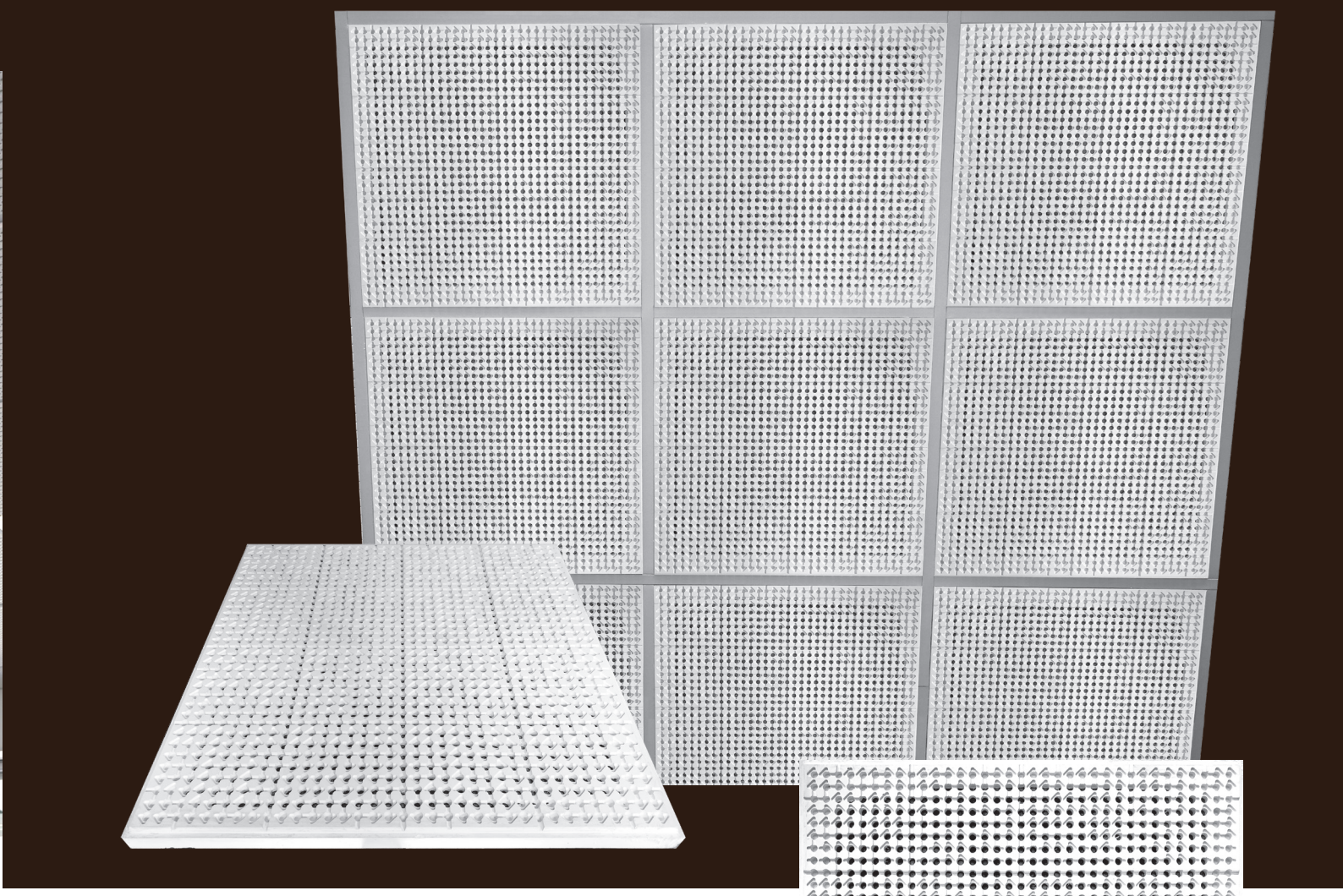
Forrest Parade Special Needs School NT
Location: 120 Flynn Circuit, Bellamack Palmerston NT, Australia

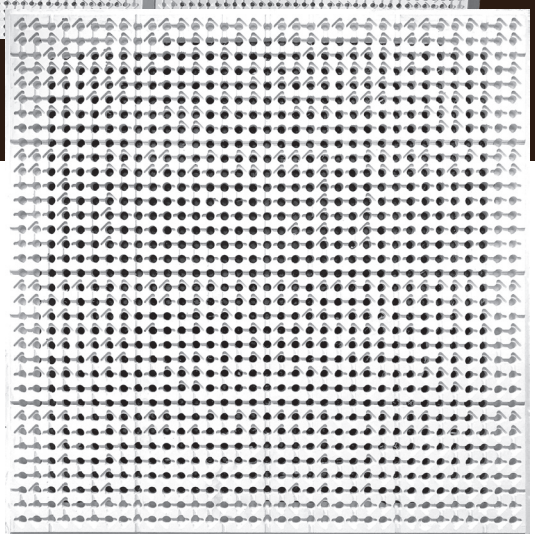
Rain noise from the low-pitched metal roof penetrating through the corrugated tin roof and into the ceiling below made learning difficult.

Northern Territory Government specified Echo Check on the Forest parade special needs school, because of the high CAC qualities provided by the plaster scrim over the insulation, (this had an added effect of reducing the rain noise from the low-pitched metal roof,) as well as the sound absorption abilities within the room, the result was most satisfactory and resulted in reducing noise penetrating through the corrugated tin roof and into the ceiling below.

All dimensions are in mm and are approximate

Interface 2020





PROPERTIES

- Bevelled edge.
- Insulation is integrated. Fiberglass insulation batt inserted into tile during manufacture. 32Kg/m^3, 20mm thick Glasswool
- To be used in conjunction with ceiling grid exposed 24mm T Bar steel or aluminium 600 x 600 system.

Interface 2020 ACOUSTIC PERFORMANCE AND SPECIFICATION

Open Area	Thickness mm	Size mm	CAC	R Value	NRC	SAA	% Light Reflective	Mass Kg/m^2	Weight per Tile - Kg
26.7%	30	600 x 600	39	0.80	0.80	0.81	0.80	12.20	4.5

All dimensions are in mm and are approximate

HUSH INSTALLATION (TOP)

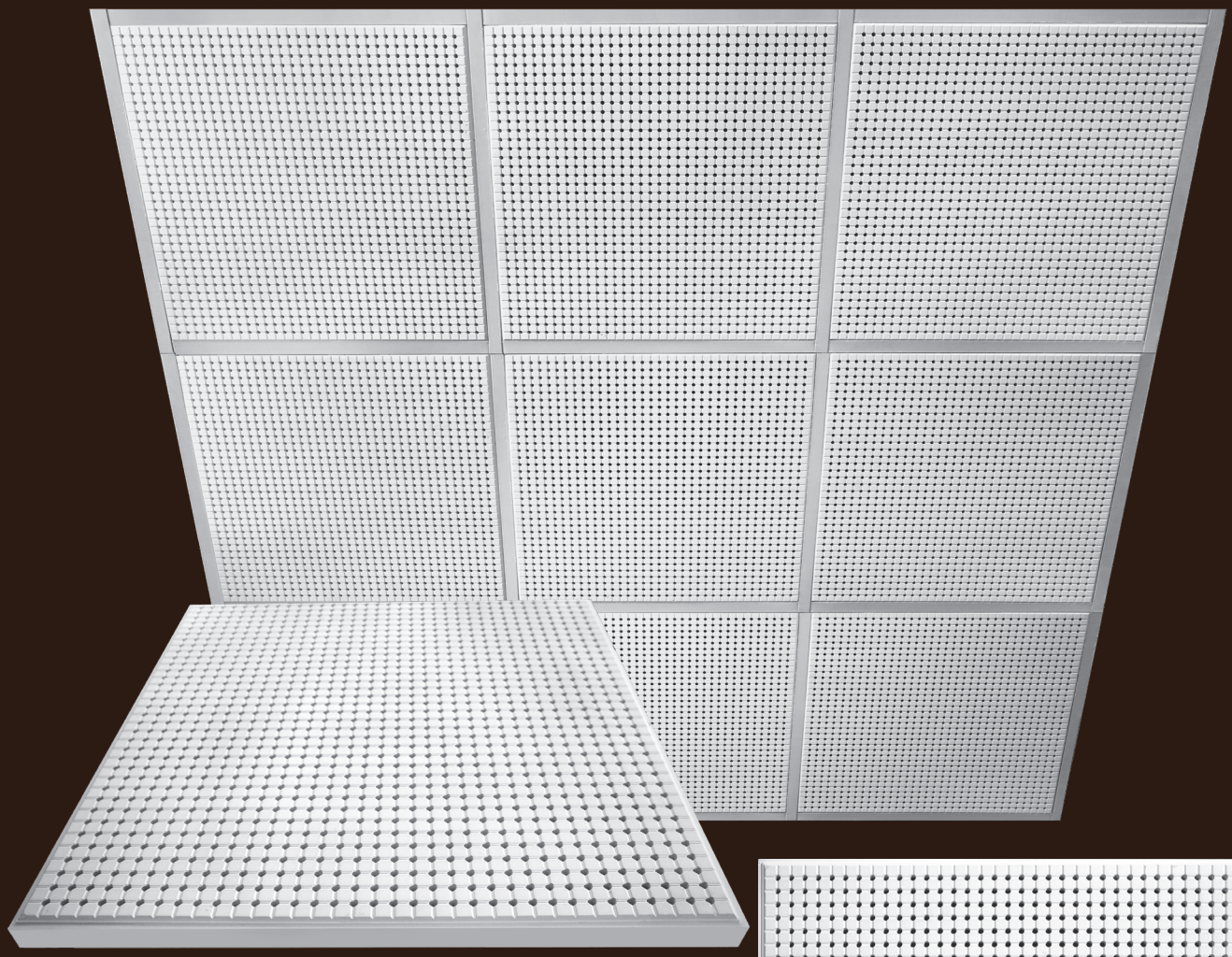
MINING COMPANY HEAD OFFICE
FANNIE BAY NT AUSTRALIA

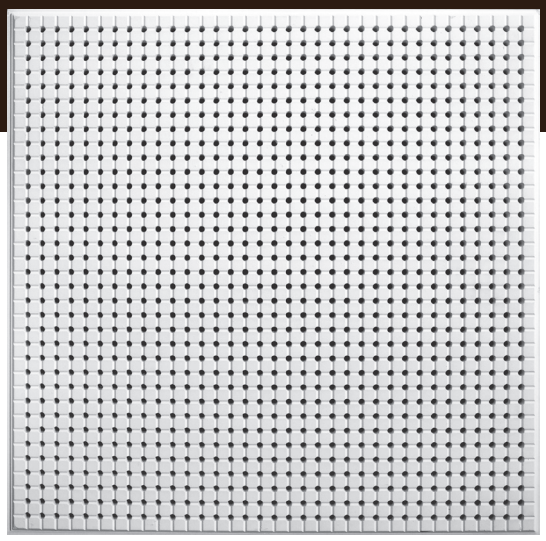
HUSH INSTALLATION (BOTTOM)

CHARLES DARWIN UNIVERSITY
NT AUSTRALIA

All dimensions are in mm and are approximate

Hush





PROPERTIES

- Bevelled edge.
- Insulation is integrated. Fiberglass insulation batt inserted into tile during manufacture. 32Kg/m^3, 20mm thick Glasswool
- To be used in conjunction with ceiling grid exposed 24mm T Bar steel or aluminium 600 x 600 system.

Hush ACOUSTIC PERFORMANCE AND SPECIFICATION

Open Area	Thickness mm	Size mm	CAC	R Value	NRC	SAA	% Light Reflective	Mass Kg/m^2	Weight per Tile - Kg
10.5%	30	600 x 600	34	0.80	0.70	0.69	0.78	12.20	4.5

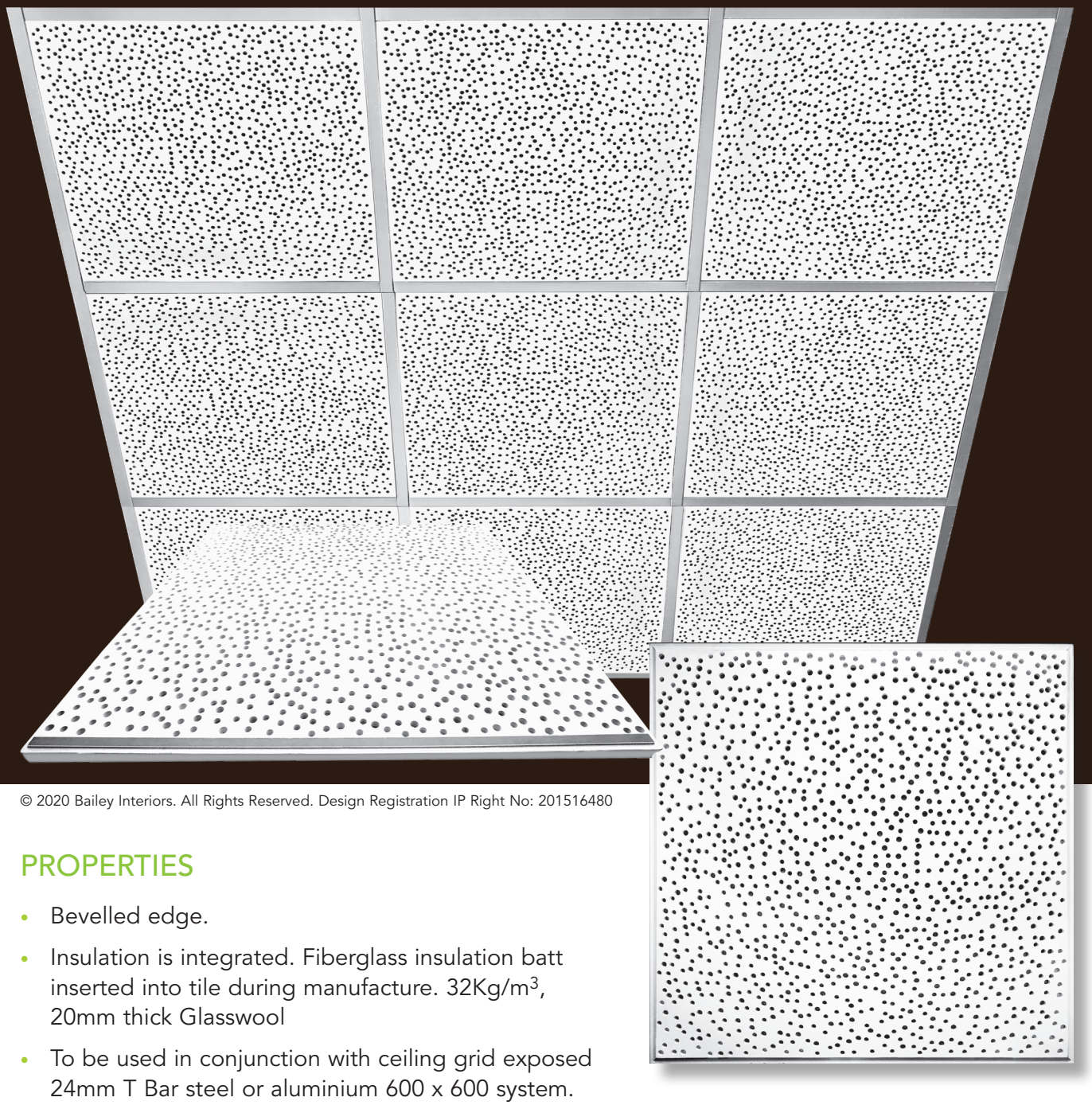
All dimensions are in mm and are approximate

RANDOM HOLE INSTALLATION

KINGSGROVE RSL SYDNEY NSW AUSTRALIA

All dimensions are in mm and are approximate

Random Hole



PROPERTIES

- Bevelled edge.
- Insulation is integrated. Fiberglass insulation batt inserted into tile during manufacture. 32Kg/m^3, 20mm thick Glasswool
- To be used in conjunction with ceiling grid exposed 24mm T Bar steel or aluminium 600 x 600 system.

Random Hole ACOUSTIC PERFORMANCE AND SPECIFICATION

Open Area	Thickness mm	Size mm	CAC	R Value	NRC	% Light Reflective	Mass Kg/m^2	Weight per Tile - Kg
16.6%	30	600 x 600	35	0.80	0.70	0.80	12.20	4.5

All dimensions are in mm and are approximate

PLASTER ACOUSTIC CEILING TILES

- for concealed direct fixing

These tiles are designed specially for a concealed grid system. Installation is by direct fixing to furring channels.
The tiles are supplied with an integrated sound absorbent batt inserted during casting and are produced in two different patterns.

ACOUSTIC PROPERTIES

These tiles measure 30mm thick, 600 x 600mm with a 20mm thick sound absorbent batt giving outstanding NRC and CAC results.

ADVANTAGES

1. Dimensionally stable will not warp or buckle
2. Not affected by humidity, no variance up to 95 % humidity
3. Fire resistant Group 1 Rating
4. Acoustic properties excellent NRC and CAC Rating
5. Mass 12.0-12.5 kg/m2

THE RANGE CONSISTS OF:

ECOCHECK DIRECT FIX CEILING TILE

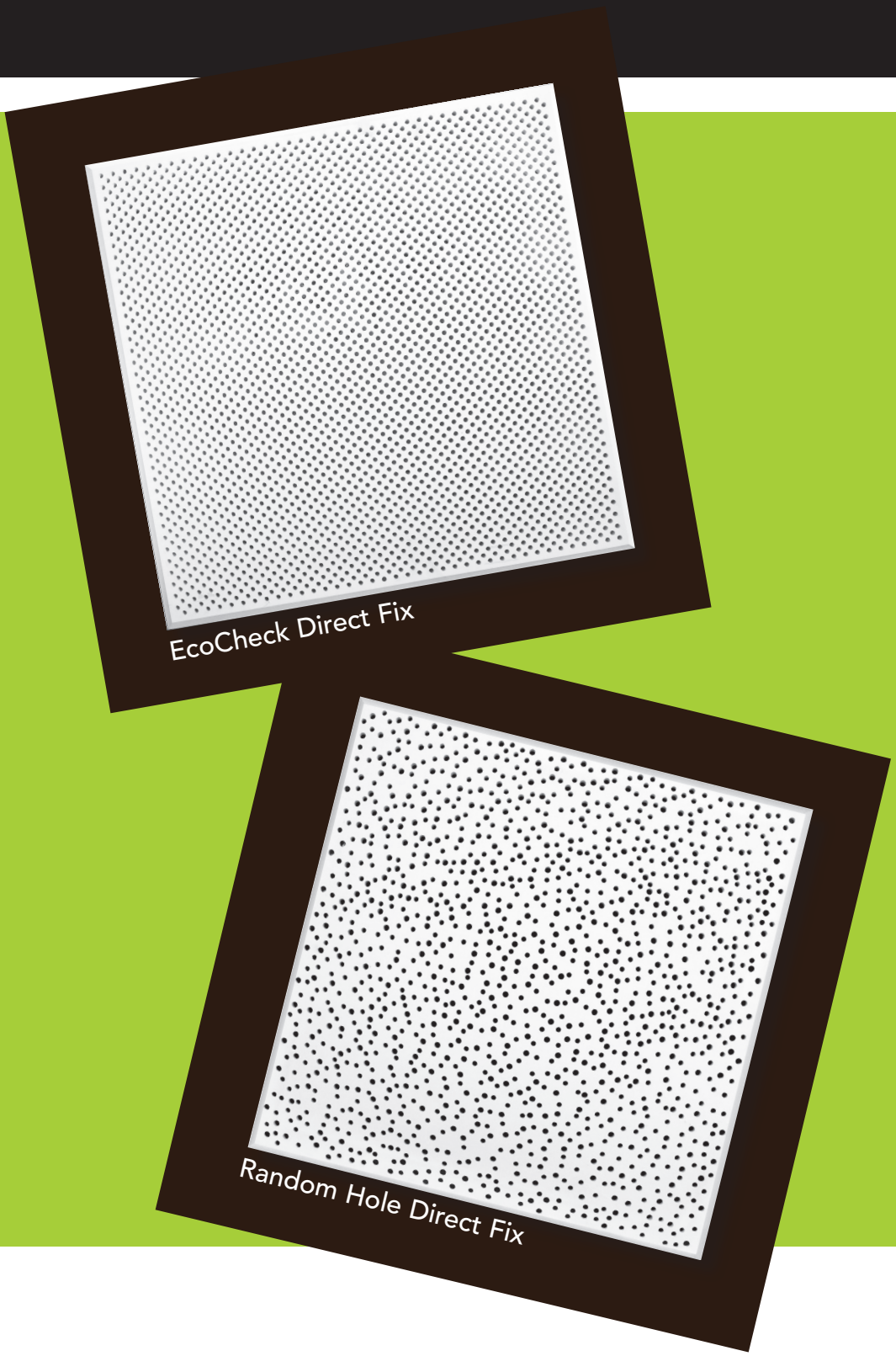
A diamond pattern tile

RANDOM HOLE DIRECT FIX CEILING TILE

A plain faced tile with Random Hole circular perforations over the entire tile

All dimensions are in mm and are approximate

PLASTER ACOUSTIC CEILING TILES FOR CONCEALED GRID SYSTEM



CASE STUDY

The Summit : Offices

Location: 734 Victoria Road Ryde NSW Australia

The Summit is a brand new, mixed use development that required acoustic treatment. Australian Plaster Acoustics was asked to help control acoustics within the building.

There was a need to manage the sound reverberation and reduction of noise within the commercial office space of the development, so acoustic ceiling tiles were a necessary inclusion.

The EcoCheck Direct Fix system was chosen due to its high sound absorption (NRC = 0.80) and high sound blocking (CAC = 42) properties, making them exceptionally high performing. These plaster acoustic ceiling tiles were also lightweight which made installation easier and ideal for this project.

The EcoCheck design offered an attractive ceiling solution with the highest acoustic rating possible to reduce noise transfer and echoing.

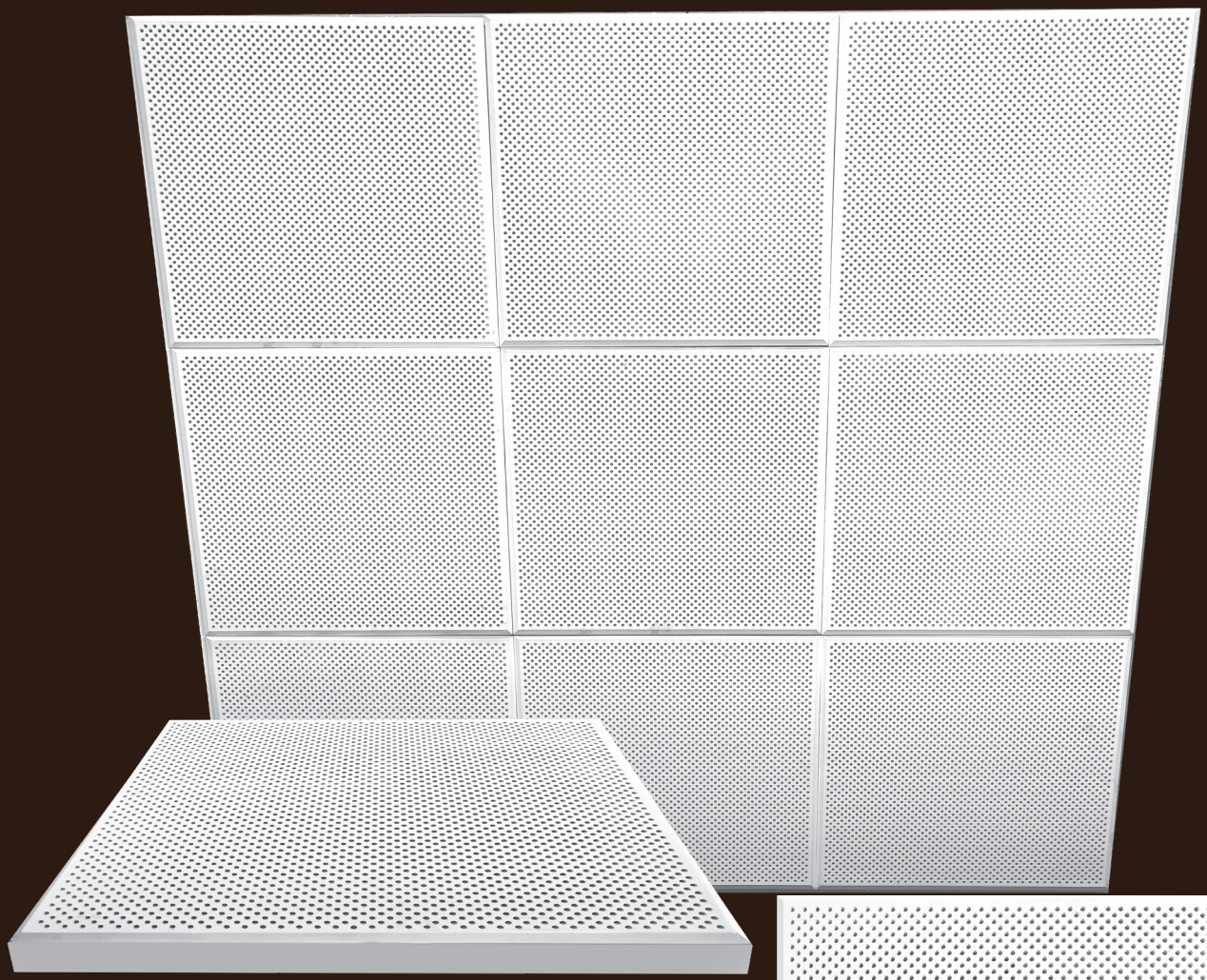
The refurbished ceiling has substantially improved the overall performance and aesthetics of the office.

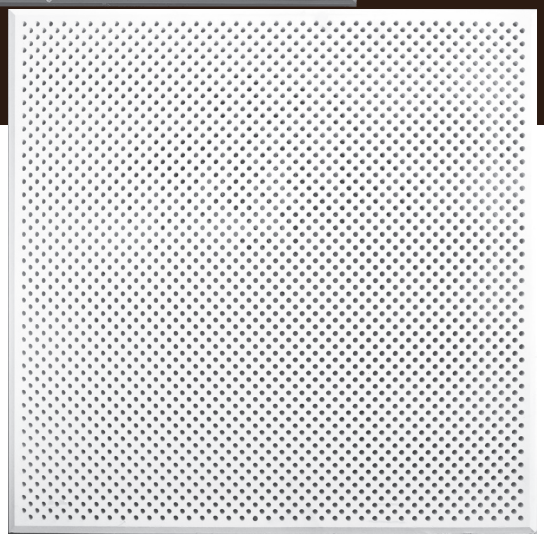
ECOCHECK DIRECT FIX INSTALLATION

THE SUMMIT OFFICE
RYDE NSW AUSTRALIA

All dimensions are in mm and are approximate

EcoCheck Direct Fix





PROPERTIES

- V - edged tile.
- Insulation is integrated. Fiberglass insulation batt inserted into tile during manufacture. 32Kg/m^3, 20mm thick Glasswool
- To be used in conjunction with concealed Rondo Furring Channel No 155 system.

EcoCheck DF ACOUSTIC PERFORMANCE AND SPECIFICATION

Open Area	Thickness mm	Size mm	CAC	R Value	NRC	SAA	% Light Reflective	Mass Kg/m^2	Weight per Tile - Kg
21.3%	30	600 x 600	42	0.80	0.8	0.79	0.80	12.5	4.5

All dimensions are in mm and are approximate

RANDOM HOLE DIRECT FIX INSTALLATION

LDS CHURCH
LAMI FIJI

All dimensions are in mm and are approximate

Random Hole Direct Fix

PROPERTIES

- V - edged tile.
- Insulation is integrated. Fiberglass insulation batt inserted into tile during manufacture. 32Kg/m^3, 20mm thick Glasswool
- To be used in conjunction with concealed Rondo Furring Channel system.

Random Hole DF ACOUSTIC PERFORMANCE AND SPECIFICATION

Open Area	Thickness mm	Size mm	CAC	R Value	NRC	SAA	% Light Reflective	Mass Kg/m^2	Weight per Tile - Kg
12.0%	30	600 x 600	38	0.80	0.75	0.72	0.80	12.5	4.5

All dimensions are in mm and are approximate

SUMMARY

LIGHTWEIGHT PLASTER ACOUSTIC TILES – EXPOSED GRID CEILING SYSTEM

Tile Dimensions: 600mm x 600mm x 30mm Thick, Mass 12.20 Kg/m^2

	Open Area	Glasswool				R Value	% Light Reflective	Suspension
		NRC	CAC B[1]	CAC dB[2]	SAA			
EcoCheck	21.3%	0.80	35	38	0.78	0.80	0.80	Duo1/Duo x1200 Duo2/600
Shadex	10.1%	0.75	32	35	0.72	0.80	0.80	
New Shadex	19.8%	0.80	38	41	0.81	0.80	0.80	
Interface 2020	26.7%	0.80	39	42	0.81	0.80	0.80	
Hush	10.5%	0.70	34	37	0.69	0.80	0.78	
Random Hole	11.5%	0.70	35	38	0.70	0.80	0.76	

PLASTER ACOUSTIC TILES – CONCEALED DIRECT FIXING

Tile Dimensions: 600mm x 600mm x 30mm Thick, Mass 12.50 Kg/m^2

	Open Area	Glasswool				R Value	% Light Reflective	Suspension
		NRC	CAC dB[1]	CAC dB[2]	SAA			
EcoCheck DF	21.3%	0.80	42	45	0.79	0.80	0.80	Furring Rondo 155
Random Hole DF	12.0%	0.75	38	41	0.72	0.80	0.80	

1 – CAC Tile only

2 – CAC R3.5 insulation batts,1800 each side of partition

SUMMARY - PHYSICAL PROPERTIES

- **Material:** Glass reinforced plaster
- **Surface finish:** Factory applied white Anti Mould paint (Plaster acoustic tiles only)
- **Flame spread/ fire resistance:** Conforms to BCA Spec Cl 10 tested to AS/NZS 3837 - 1998 Group 1
- **Thermal resistance (R Value):** 0.80 m^{2}k/w
- **Insulation:** FBS-1 Glasswool Insulation, 32Kg/m^3, compressed to 20mm thick, with lightweight black acoustic fabric backing
- This product has a "non-dangerous goods" classification
- Dimensional stability up to 95% humidity

All dimensions are in mm and are approximate

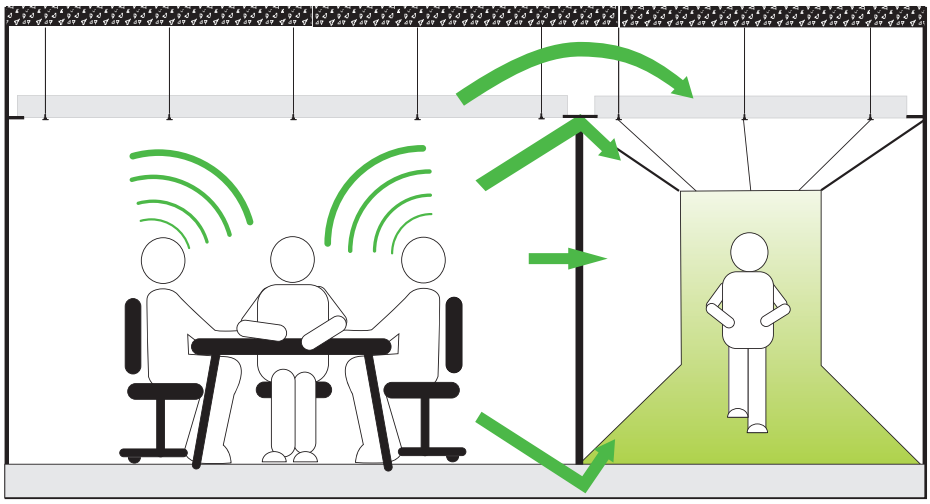
CAC - Ceiling Attenuation Class

ABOUT CAC - Ceiling Attenuation Class

CAC is an important measure of sound transfer between adjacent rooms and or a corridor.

Ceiling Attenuation Class indicates the ceilings ability to prevent airborne sound from travelling between adjacent rooms when the dividing wall does not connect with the structural ceiling.

Higher Values are better. A CAC value of 35 dB or above is considered to be very good.



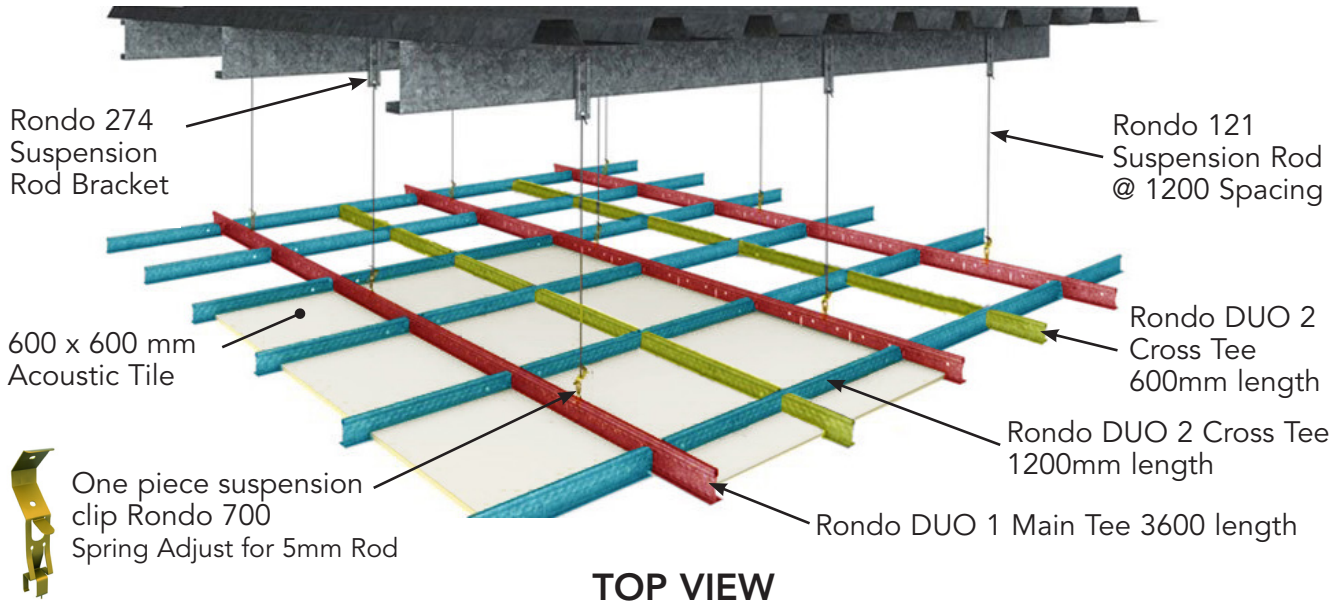
INSTALLATION TIPS

LIGHT WEIGHT PLASTER ACOUSTIC CEILING TILES, 600 X 600 MM RANGE

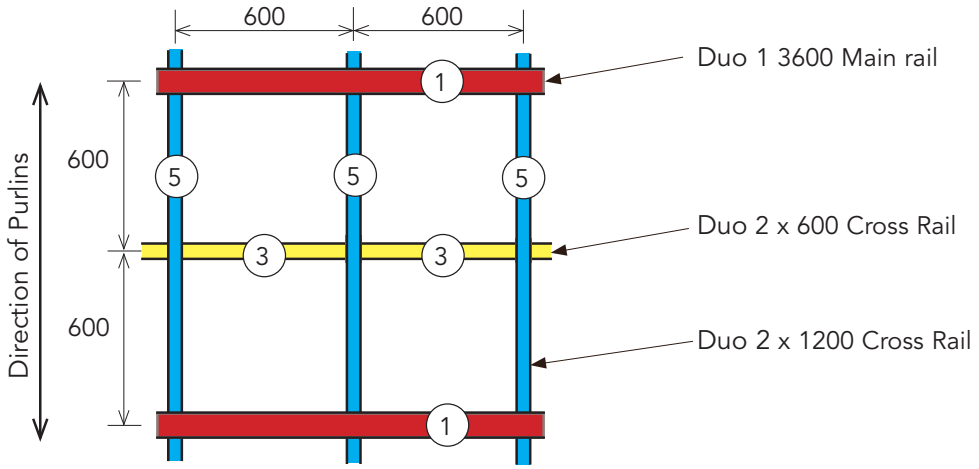
1. Plan ceiling layout to provide even margins at the perimeter.
2. Centre the ceiling both ways ensuring centre lines are at right angles.
3. Fix wall angle trim to perimeter walls at the correct height set by a level line. Mitre the wall angle trim around piers and columns.
4. Fix ceiling grid in accordance to Rondo grid layout using Duo system.
5. Cutting tiles can generally be avoided by designing the ceiling so that whole tiles or panels extend as close as practicable to the room area perimeters and then filling to the wall with a plaster board margin.
6. If cutting cannot be avoided the following typical methods are recommended.
   - When ordering plaster acoustic ceiling tiles make sure to order solid tiles with the same pattern but without the acoustic insulation, these separate tiles will make cutting of the tiles much easier to perform.
   - Use a router bit to cut panels and tiles to the required size. The router bit rebates the tile to enable installation into the ceiling grid.
   - Panels and tiles can also be cut to size with a panel saw.
   - Cable penetrations and sprinkler head holes should be cut into solid tiles or panels using a drill with an appropriate hole saw attachment.
   - Down light & pipe penetrations should also be cut into solid tiles or panels using a key hole saw or a drill with an appropriate hole saw attachment.

GRID SYSTEM LAYOUT

PLASTER ACOUSTIC CEILING TILE 600 X 600 MM RANGE



TOP VIEW



PLAN VIEW

1 The Duo 1 main tee shall be hung on soft galvanize rod or 2.5mm wire, accurately leveled. Suspension clips shall be spaced at 1200mm centres along the Duo 1 main tee.

5 Duo 2 main tees to be spaced at 1200mm centres. Duo 2 X 1200 cross tees shall intersect main tees at 600mm centres and be positively locked together.

3 Duo 2 x 600 cross tees are to be spaced at 600mm and shall intersect Duo 1200 cross tees at 600mm centres and be positively locked together.

Wall angle shall be securely fixed to the wall at 600mm centres providing a true level edge.

The suspension hangers, main tees and cross tees shall be spaced as not to exceed the design ceiling load, or
as required to prevent deflection, in excess of 1/360 of the span of cross tee or main tee.

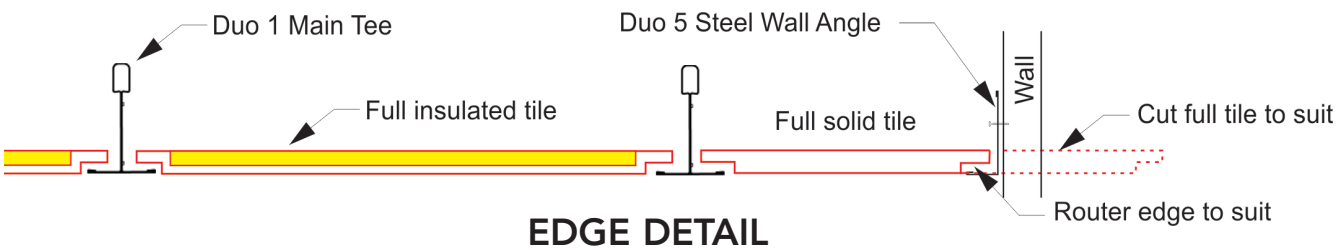
Extra hangers are to be provided for light fittings and conditioning units etc.

All light fittings are to be supported on the main tee.

All dimensions are in mm and are approximate

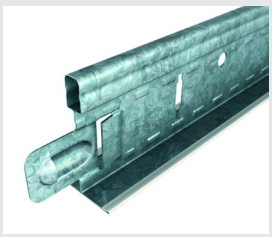
INSTALLATION

Exposed Suspended Grid Installation Using RONDO DUO Ceiling System

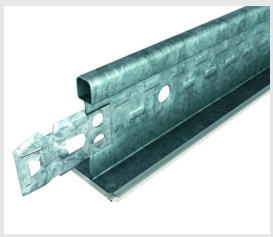


EDGE DETAIL

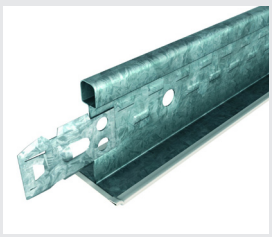
RONDO DUO COMPONENTS



Rondo DUO 1
24 x 38mm Main Tee
3600 mm Length



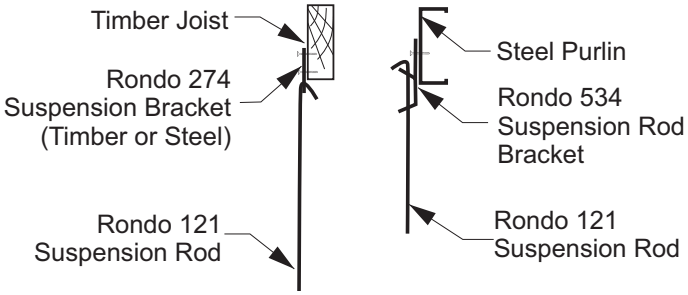
Rondo DUO 2
24 x 34mm Cross Tee
1200 mm Length



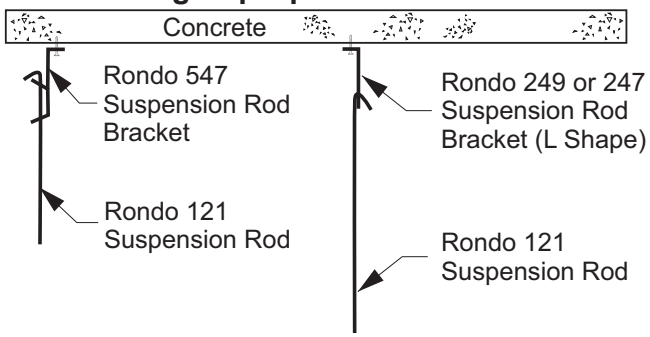
Rondo DUO 2
24 x 34mm Cross Tee
600 mm Length

Rondo DUO 5
25 x 19mm Steel
Wall Angle

Direct Fixing Clip Options to Timber or Steel Purlins



Direct Fixing Clip Options to Concrete



FIXING DETAIL

RONDO SUSPENSION ROD HANGERS

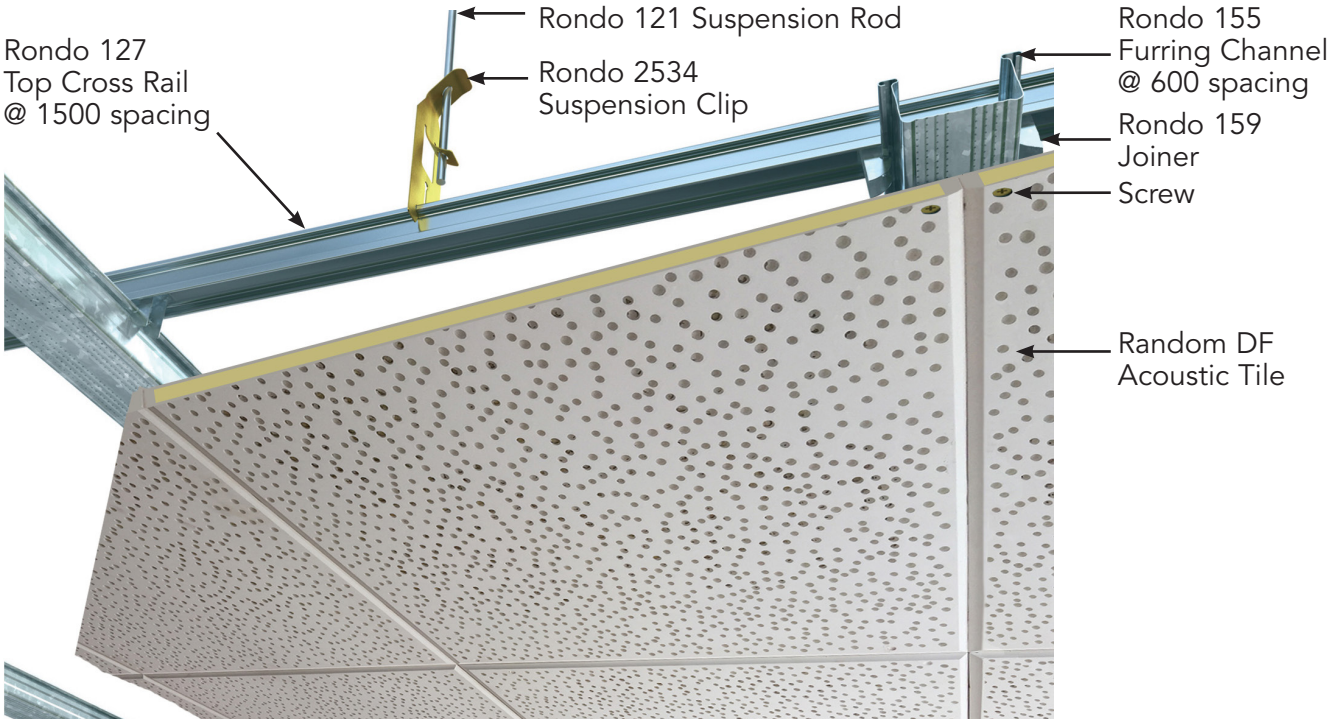
Rondo 274
Suspension Rod Bracket
(Timber/ Steel)

Rondo 547
Adjustable Hanger
(Concrete)

Rondo 534
Adjustable Hanger
(Purlins)

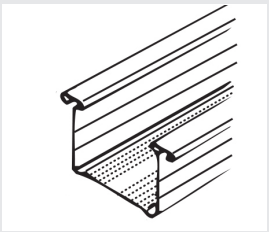
Rondo 247
Suspension Rod
Bracket (Concrete)

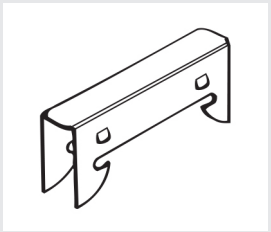
CONCEALED SUSPENDED CEILING INSTALLATION

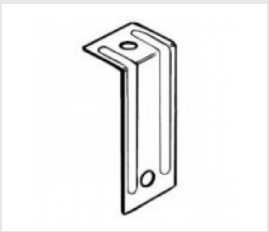


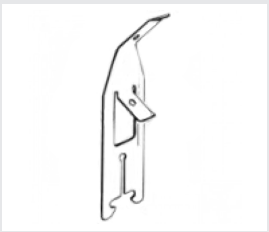
BOTTOM VIEW Typical Ceiling Installation with RONDO KEY-LOCK® Ceiling System

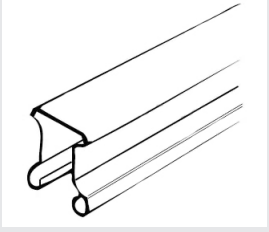
RONDO KEY-LOCK® Components

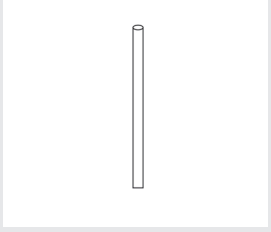

155 Furring Channel

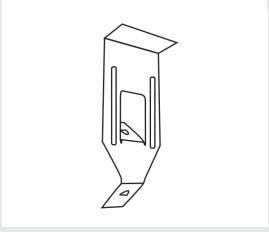

159 Joiner

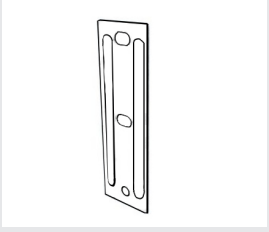

Rondo 247
Suspension Rod
Bracket


Rondo 2534
Suspension Clip

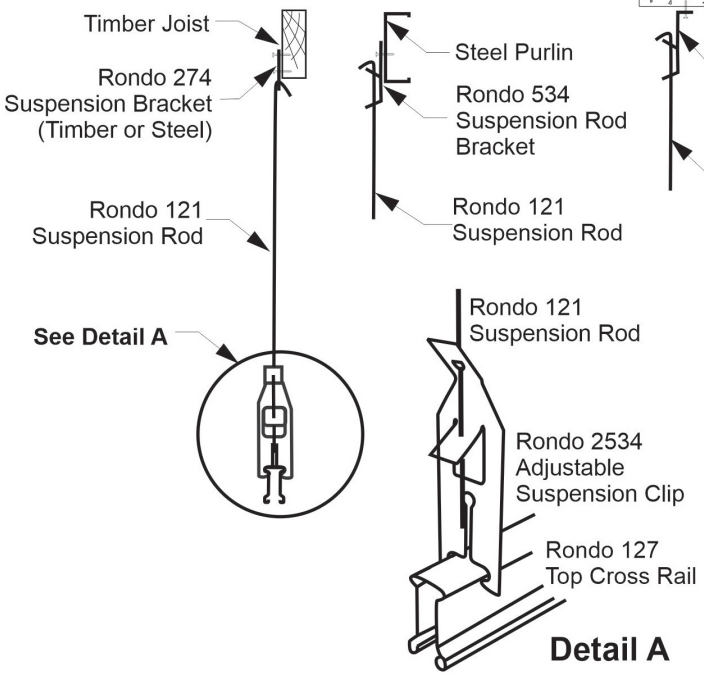

Rondo 127
Top Cross Rail


Rondo 121
Suspension Rod


Rondo 547 Adjustable
Suspension Hanger

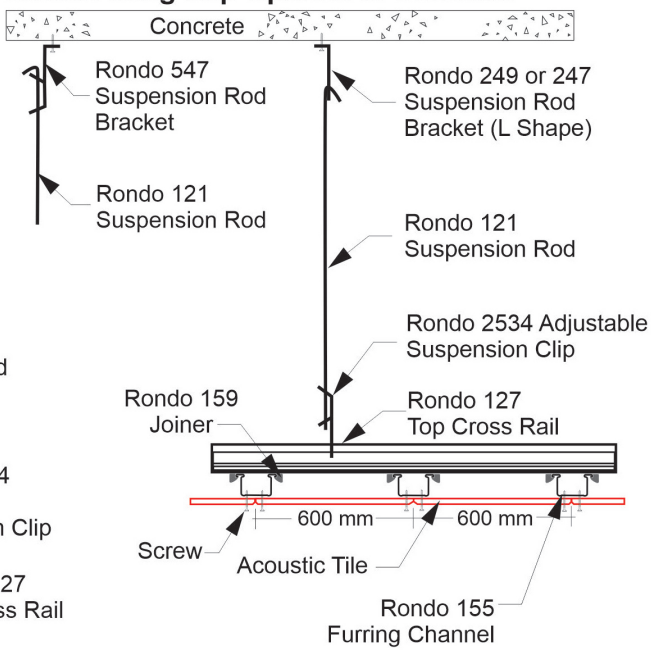

Rondo 274
Suspension Bracket

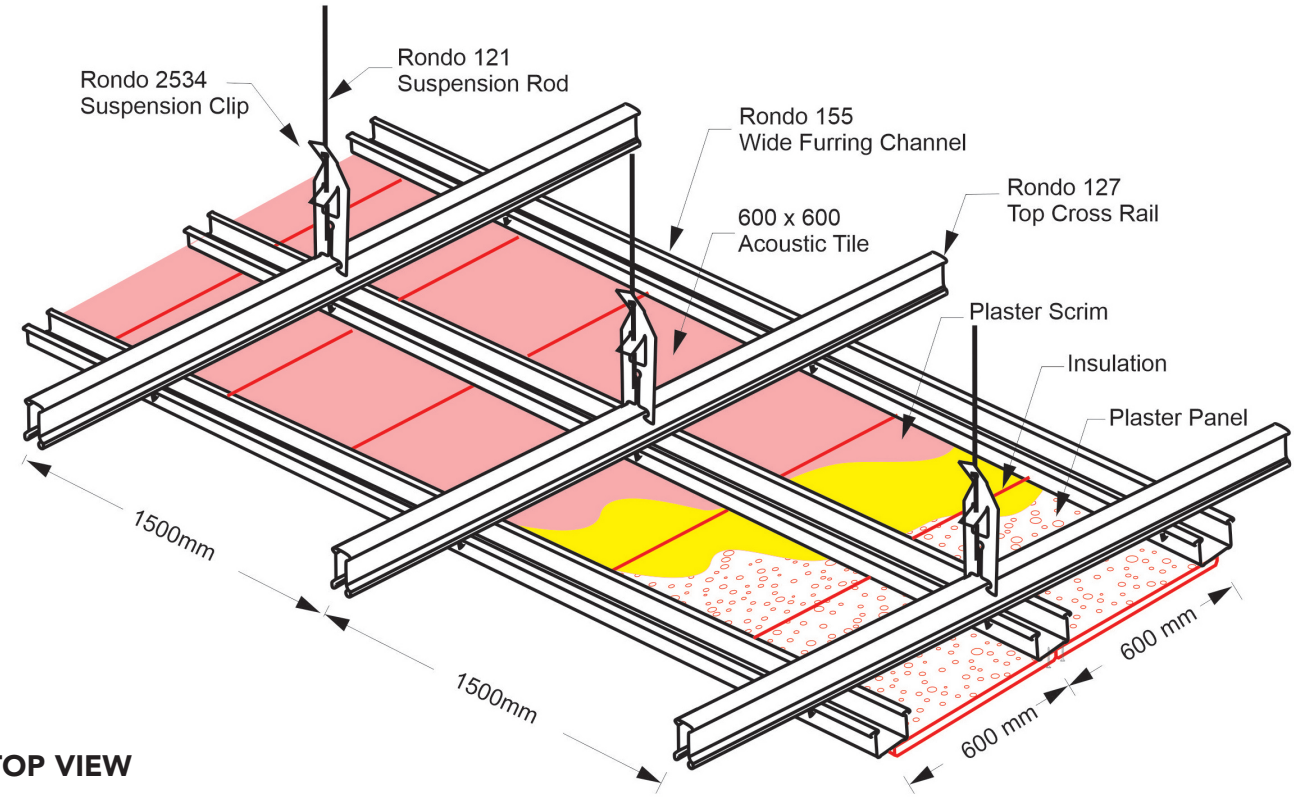
Direct Fixing Clip Options to Timber or Steel Purlins



Detail A

Direct Fixing Clip Options to Concrete

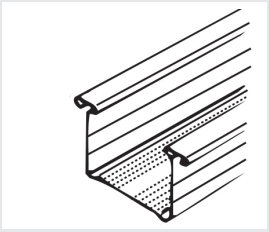




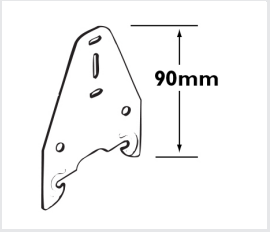
TOP VIEW

DIRECT FIX CEILING INSTALLATION

Typical Direct Ceiling Installation with RONDO KEY-LOCK® Components

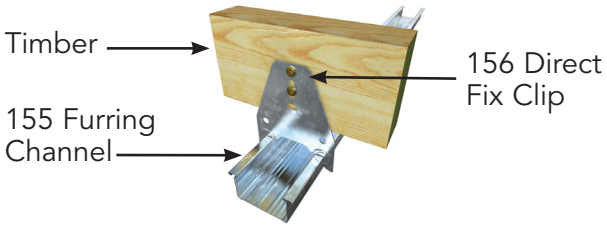


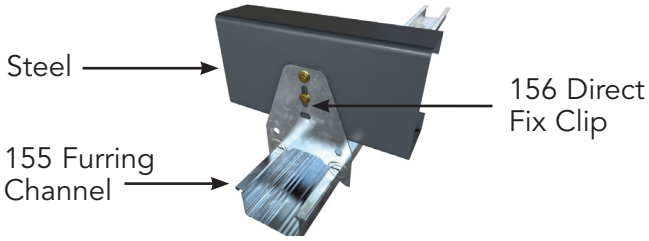
155 Furring Channel



156 DIrect Fix Clip

The 156 Direct Fix Clip is able to fix the 155 Furring Channel to steel purlins or timber joists in ceiling applications

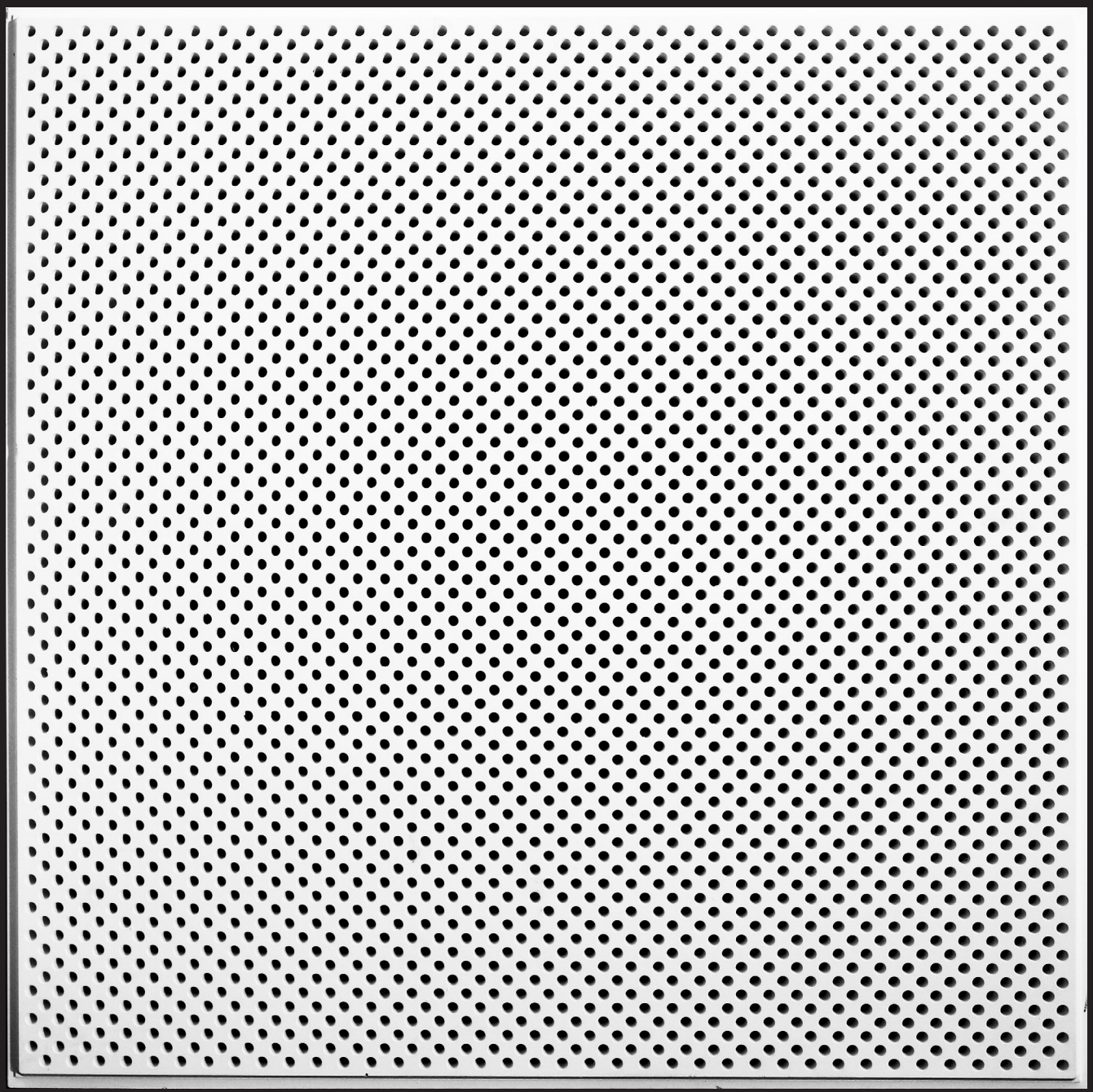




All dimensions are in mm and are approximate

TEST RESULTS

EcoCheck



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: **AC270-05-1**

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^2), Test configuration: Type E-400]

Description: • Bailey "EcoCheck" drop-in acoustic ceiling tiles
• with integral glass fibre batt behind, non-encapsulated

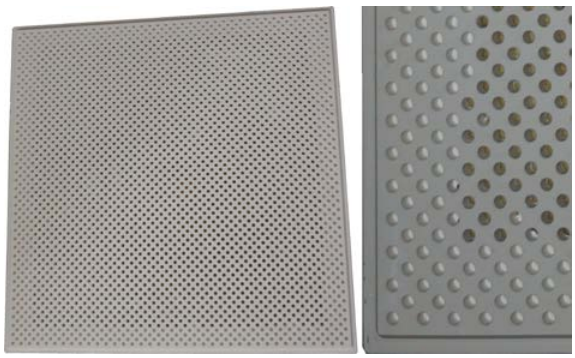
Tile Details[3]

- Perforated moulded plaster ceiling tiles, approx 588 x 588 mm (x 30 mm thick) designed to drop into a standard 600 mm suspended ceiling grid.
- Manufactured with an integral glass fibre batt (Bradford Supertel, 32 kg/m^3, 20 mm thick) behind the perforated face, constrained around the perimeter at the rear with plaster skim-coat covering the outer 60 mm of the batt (approx).
- Perforated in a regular pattern of 6.5 mm dia holes (2888 count); the perforations in the vicinity of the perimeter being open only at the face (closed at the rear), with the perforations away from the perimeter being open front and back (exposing the glass fibre batt behind).
- Open area percentage[4] (estimated): 21.3% (only holes open front and back); 26.6% (all holes).

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^2, built to surround an area of 3600 x 3000 mm) was placed on the floor of the chamber, 11° 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 tiles. The cavity behind the panels was a single undivided cavity without internal partitions.
- Specimen tiles were arranged in a 6 x 5 array on the support system.
- Tee sections were placed on top to cover the gaps between adjacent tiles and acoustically mimic a normal ceiling installation. The perimeter of the installed test specimen was taped with masking tape to seal gaps between the tiles and the enclosure.
- Specimen installation was carried out by laboratory staff.

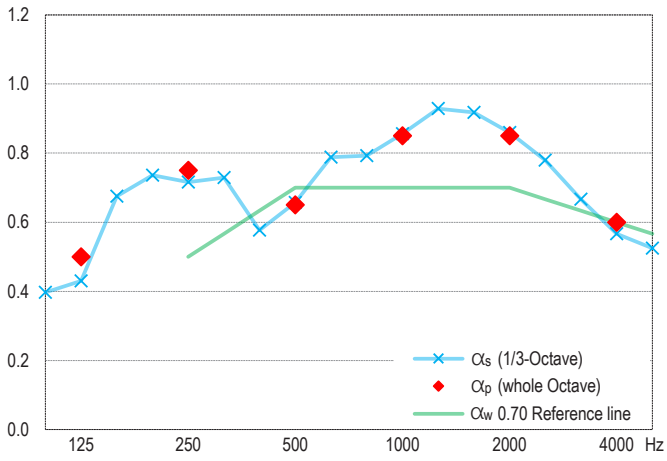
Test specimen installed for testing (image inverted to depict ceiling installation)



Tile details – Left: whole tile, Right: close-up view

Measurement Details & Results

Freq	Absorption coefficients			Reverberation times, T_{60} (sec)	
Hz	α_s	α_p	95% Conf (δ)	Empty room	with Specimen
100	0.40		0.07	5.82	3.27
125	0.43	0.50	0.08	6.86	3.43
160	0.68		0.08	6.59	2.63
200	0.74		0.06	6.43	2.47
250	0.72	0.75	0.06	5.40	2.33
315	0.73		0.05	6.57	2.50
400	0.58		0.05	6.31	2.82
500	0.66	0.65	0.05	5.91	2.55
630	0.79		0.05	5.47	2.23
800	0.79		0.03	5.00	2.14
1000	0.86	0.85	0.04	4.84	2.02
1250	0.93		0.04	4.30	1.84
1600	0.92		0.06	3.93	1.77
2000	0.86	0.85	0.04	3.53	1.74
2500	0.78		0.03	3.22	1.73
3150	0.67		0.03	2.96	1.74
4000	0.57	0.60	0.03	2.58	1.66
5000	0.52		0.05	2.21	1.49



Performance Indices[1,2]
α_w = 0.70 (L)
SAA = 0.78
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:	15 Jan 2020	15 Jan 2020
Temperature & humidity:	27 °C, 58 % R.H.	29 °C, 41 % R.H.
Atmospheric pressure:	996 mBar	992 mBar

Notes, Deviations etc

1. Shape indicators (L, M, and H), if any, following the α_w index, indicate α_p 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. Open area estimates are based on 600 x 600 mm of ceiling area being 'treated' by each tile.

Issuing Authority

Signed:
David Truett
Date: 24 January 2020

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 a plasterboard wall) • parallelepiped with dimensional proportions 1:1.3:1.6 for distribution of room modes • approx 202 m^3 total room volume • approx 215 m^2 surface area excluding diffusers
Diffusers: • 20 stationary diffusers, approx 40 m^2 total surface area
Absorption area: • in accordance with AS ISO 354, unless noted otherwise

ACOUSTIC LABORATORIES AUSTRALIA PTY LTD

Unit 3/2 Hardy Street
South Perth 6151
Tel: 9474 4477
Fax: 9474 5977

AIRBORNE SOUND ATTENUATION BETWEEN ROOMS SHARING COMMON CEILING PLENUM

ALA Test No.: **16-095-4**
Client: **Australian Plaster Acoustics**
Specimen: Ecocheck tegular edge
Detail: 600 x 600 Plaster Acoustic Tile

Description of Specimen:

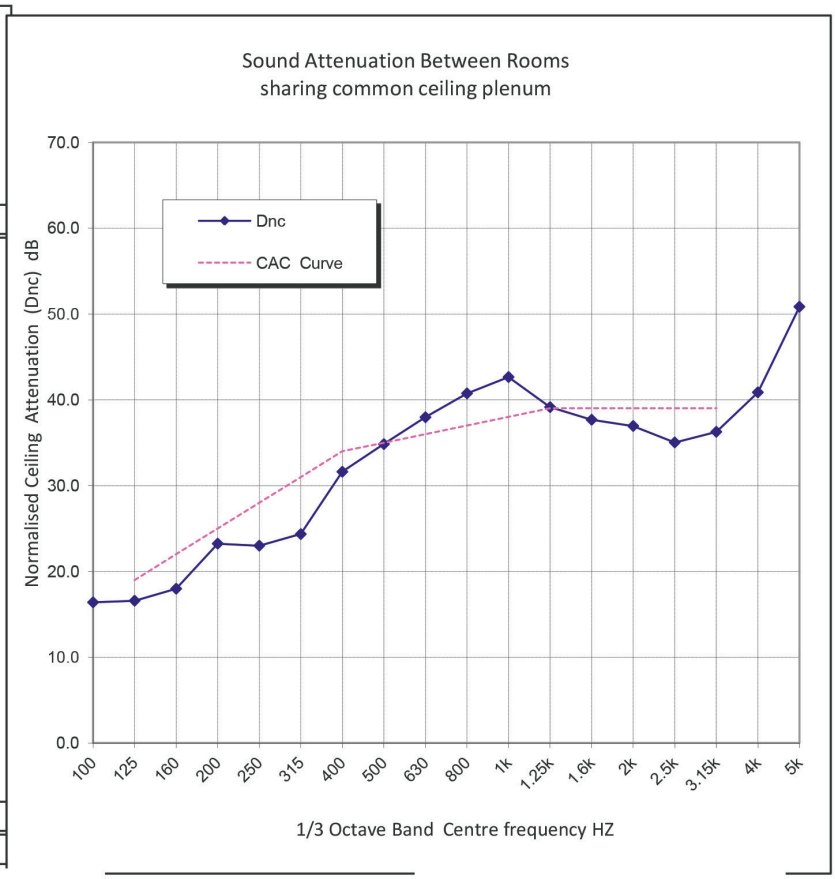
Ecocheck Tile, Tegular Edge 600 x 600 X 28mm Plaster Acoustic Tile
Nominal open area 22.7%
25mm glasswool insulation @ 32 kg/m3; compressed to 20mm
Thin 2mm plaster skim coat over insulation to seal tile
Nominal weight per tile 4.35 kg
Lay in Tee Bar grid, Rondo Duo 1 & 2

Meas. Date: 10-Aug-16

Tested in accordance with
ASTM E1414 / E1414M - 11a

CEILING ATTENUATION CLASS **CAC** **35**

Centre Frequency	Dnc	CAC Curve	Deficiencies
Hz	dB	dB	dB
100	**16.4**		
125	**16.6**	19	2.4
160	**18.0**	22	4.0
200	**23.2**	25	1.8
250	**23.0**	28	5.0
315	**24.3**	31	6.7
400	**31.6**	34	2.4
500	**34.8**	35	0.2
630	**38.0**	36	
800	**40.7**	37	
1k	**42.7**	38	
1.25k	**39.1**	39	
1.6k	**37.7**	39	1.3
2k	**36.9**	39	2.1
2.5k	**35.0**	39	4.0
3.15k	**36.3**	39	2.7
4k	**40.9**	39	
5k	**50.8**		
			Total
CAC	**35**		32.5



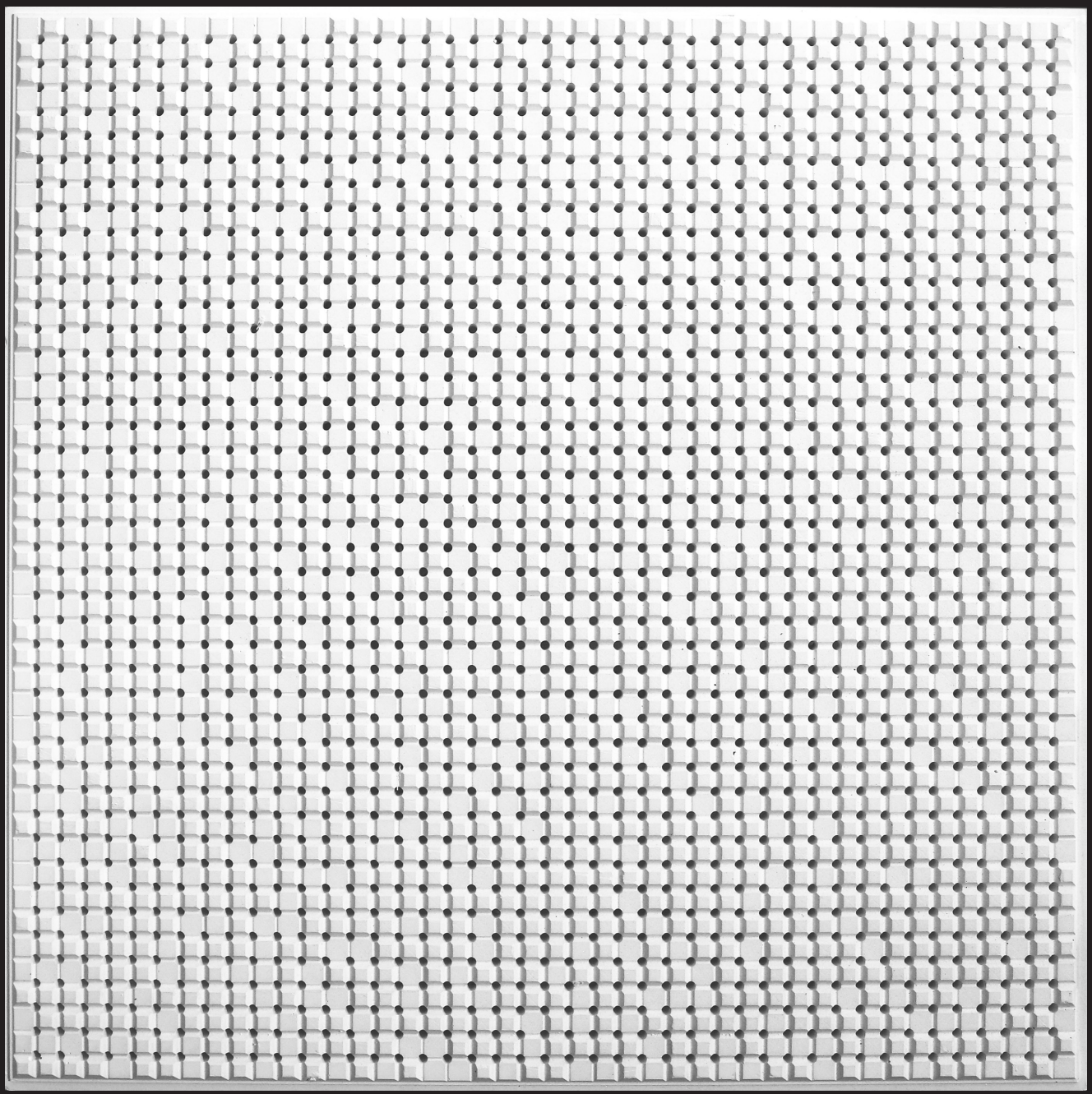
Signatory:
Tester: N Gabriels B.Arch, FAAS

Date: 12-Aug-16

Checked: K Hearne B.Arch, MAAS

TEST RESULTS

SHADEX



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: **AC287-06-1**

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

Measurement Type: Sound Absorption

AS ISO 354–2006 [R2016]: *Acoustics–Measurement of sound absorption in a reverberation room*
AS ISO 11654–2002 [R2016] (ISO 11654:1997): *Acoustics–Rating of sound absorption–Materials and systems*

Test Specimen

[Specimen area: 3.6 x 3.0 m (10.8 m²)]

Description: • Bailey "Shadex" (original design)drop-in ceiling tiles, • in 600 mm grid,
• with integral glass fibre batts, exposed at rear to the cavity airspace (Type E-200)

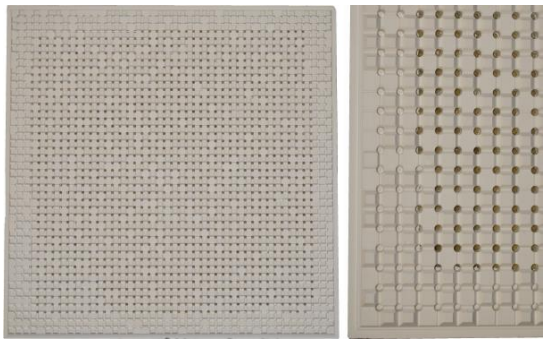
Tile Details[3]

- Moulded plaster ceiling tiles designed to drop into a standard 600 mm suspended ceiling grid.
- Perforated with a regular pattern of 1849 circular holes (43 x 43 array), of which 2 lines around the perimeter were not open at the rear, and the remainder (39 x 39) opened into the glass fibre batt behind. Hole size was approx 5 mm at the face, tapering to 4.5 mm at the rear, positioned at approx 13 mm spacing.
- Decorative effect of perforations was supplemented by additional moulding details (grooves in the tile face between the perforations, and varying height of facets in between as per photo).
- Open area percentage[4] (estimated): 10.1 % (based on mouth area of all 1849 holes); 6.7 % (based on throat area at rear of holes, of only those holes opening into the fibre batt behind).
- Each tile was fitted with a semi rigid high-density CSR Bradford glass fibre batt, 500 x 500 x 20 mm (approx 42 kg/m³); installed during production of the tile, fixed in place by way of plaster skim-coat around the perimeter of the batt; the majority of the batt remaining open and exposed to the cavity.

Installation

- The test specimen was installed as an upside-down ceiling on the floor of the chamber.
- A 200 mm deep enclosure (32 mm MDF timber, approx 23 kg/m², built to surround an area of 3600 x 3000 mm) was placed on the floor of the chamber at an 11° angle to the chamber walls (not parallel, as per AS ISO 354 cl6.2.1.2). The enclosure consisted of two 100 mm deep modules stacked to create the E-200 enclosure. The junctions of the enclosure modules to each other, to the floor, and to the tile array were all taped.
- A system of plastic support feet sitting on aluminium extrusions (upside-down Tees) was set up inside the enclosure to support the tiles with their exposed face nominally flush with the enclosure. The cavity behind was a single undivided cavity without internal partitions.
- Tiles were arranged in a 6 x 5 array on the support system, then a full grid of main and cross tees was placed on top to cover the gaps between the tiles, matching a normal ceiling installation.
- Specimen installation was carried out by laboratory staff.

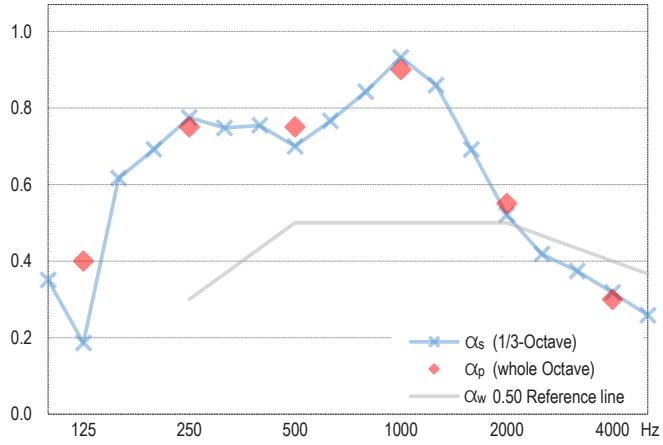
Test specimen installed for testing (image inverted to depict ceiling installation)



Tile details – Left: whole tile, Right: close-up view

Measurement Details & Results

Freq	Absorption coefficients			Reverberation times, T_{60} (sec)	
Hz	α_s	α_p	95% Conf (δ)	Empty room	with Specimen
100	0.35		0.08	5.47	3.34
125	0.19	0.40	0.05	5.90	4.32
160	0.62		0.10	6.12	2.71
200	0.69		0.07	5.61	2.45
250	0.77	0.75	0.06	4.82	2.15
315	0.75		0.04	5.68	2.35
400	0.75		0.04	5.68	2.34
500	0.70	0.75	0.04	5.27	2.37
630	0.77		0.04	5.10	2.22
800	0.84		0.04	4.86	2.06
1000	0.93	0.90	0.05	4.71	1.91
1250	0.86		0.04	4.32	1.93
1600	0.69		0.04	3.85	2.04
2000	0.52	0.55	0.03	3.49	2.18
2500	0.42		0.02	3.12	2.18
3150	0.37		0.03	2.89	2.13
4000	0.32	0.30	0.02	2.44	1.95
5000	0.26		0.04	2.01	1.73



Performance Indices[1,2]
α_w = 0.50 (LM)
SAA = 0.72
NRC = 0.75

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:	12 Mar 2021	12 Mar 2021
Temperature & humidity:	23 °C, 58 % R.H.	23 °C, 60 % R.H.
Atmospheric pressure:	1000 mBar	1001 mBar

Notes, Deviations etc

1. Shape indicators (L, M, and H), if any, following the α_w index, indicate α_p 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. Open area estimates are based on 600 x 600 mm of ceiling area being 'treated' by each tile.

Issuing Authority

Signed: .....
David Truett
Date: 17 March 2021

Instrumentation

Real time analyser: • Brüel & Kjær PULSE LAN-XI type 3160-A-4/2
Microphones/preamps: • 4 microphones (1 x B&K 4134, 1 x B&K 4166, and 2 x GRAS 40AR) on B&K and GRAS preamps, in fixed positions as per AS ISO 354
Noise source: • Room populated with three dodecahedron loudspeakers; (2 x 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 m³ total room volume • approx 215 m² surface area excluding diffusers
Diffusers: • 20 stationary diffusers, approx 40 m² total surface area
Absorption area: • in accordance with AS ISO 354, unless noted otherwise

ACOUSTIC LABORATORIES AUSTRALIA PTY LTD

Unit 3/2 Hardy Street
South Perth 6151
Tel: 9474 4477
Fax: 9474 5977

AIRBORNE SOUND ATTENUATION BETWEEN ROOMS SHARING COMMON CEILING PLENUM

ALA Test No.: **16-091-2**
Client: **Australian Plaster Acoustics**
Specimen: Shadex tegular edge
Detail: 600 x 600 Plaster Acoustic Tile

Description of Specimen:

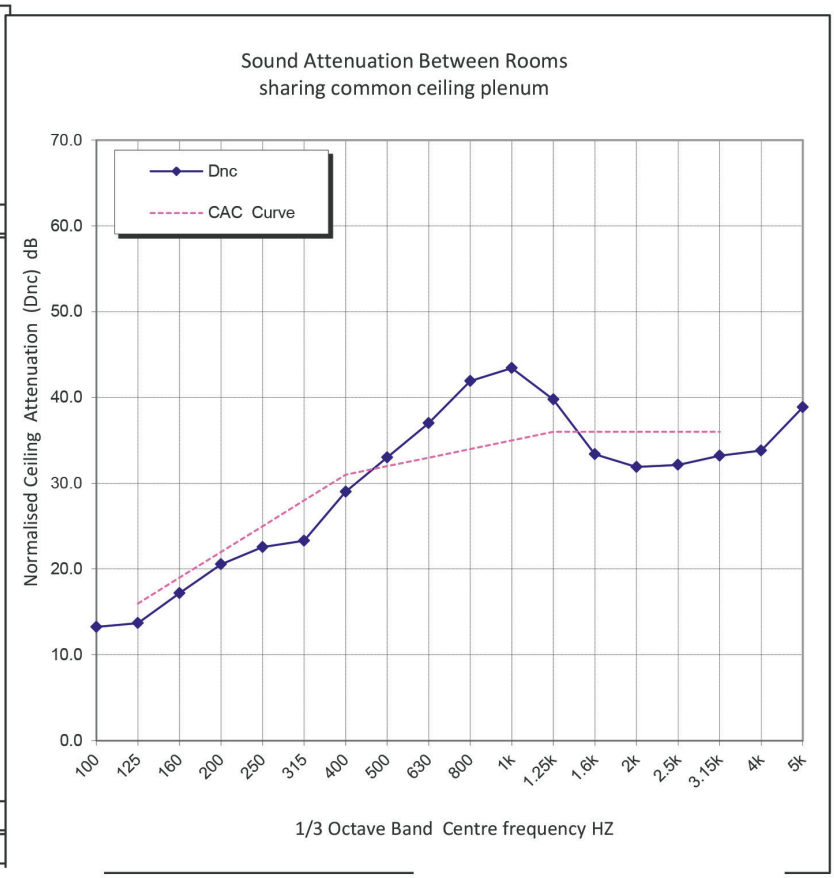
Shadex Tile, Tegular Edge 600 x 600 28mm thick Plaster Acoustic Tile
Nominal open area 15%
25mm glasswool insulation @ 32 kg/m3; compressed to 20mm
Thin 2mm plaster skim coat over insulation to seal tile
Weight per tile4.5 Kg
Lay in Tee Bar grid

Meas. Date: 13-Apr-16

Tested in accordance with
ASTM E1414 / E1414M - 11a

CEILING ATTENUATION CLASS **CAC** **32**

Centre Frequency	Dnc	CAC Curve	Deficiencies
Hz	dB	dB	dB
100	**13.2**		
125	**13.7**	16	2.3
160	**17.2**	19	1.8
200	**20.6**	22	1.4
250	**22.6**	25	2.4
315	**23.3**	28	4.7
400	**29.0**	31	2.0
500	**33.0**	32	
630	**37.0**	33	
800	**41.9**	34	
1k	**43.4**	35	
1.25k	**39.8**	36	
1.6k	**33.4**	36	2.6
2k	**31.9**	36	4.1
2.5k	**32.1**	36	3.9
3.15k	**33.2**	36	2.8
4k	**33.8**	36	2.2
5k	**38.9**		
			Total
CAC	**32**		30.2



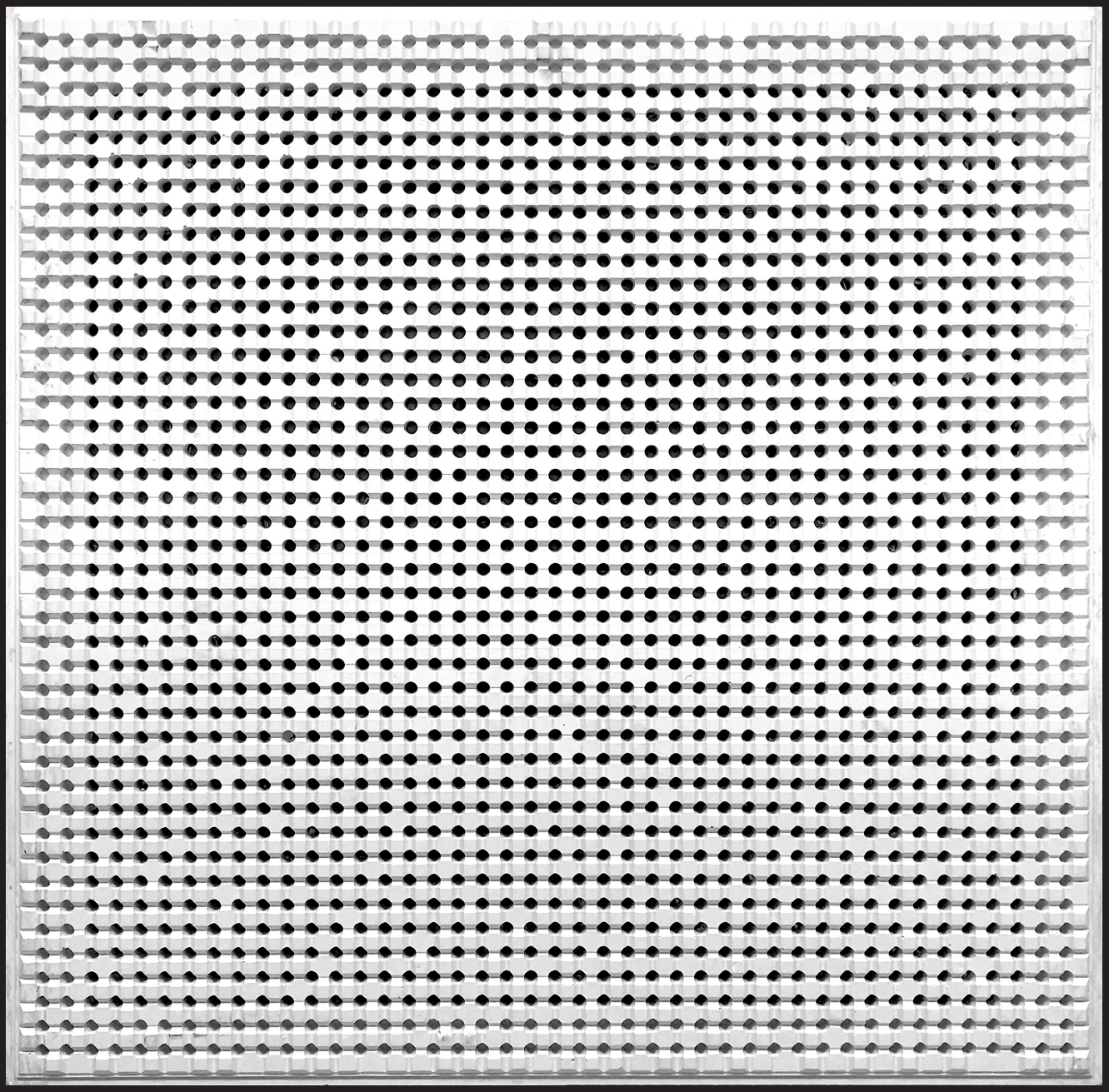
Signatory:
Tester: N Gabriels B.Arch, FAAS

Date: 15-Apr-16

Checked: K Hearne B.Arch, MAAS

TEST RESULTS

NEW SHADEX



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: **AC287-03-1**

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

Measurement Type: Sound Absorption

AS ISO 354–2006 [R2016]: *Acoustics–Measurement of sound absorption in a reverberation room*
AS ISO 11654–2002 [R2016] (ISO 11654:1997): *Acoustics–Rating of sound absorption–Materials and systems*

Test Specimen

[Specimen area: 3.6 x 3.0 m (10.8 m²)]

Description: • Bailey "New Shadex 2020" drop-in ceiling tiles, • in 600 mm grid,
• with integral glass fibre batts, exposed at rear to the cavity airspace (Type E-200)

Tile Details[3]

- Moulded plaster ceiling tiles designed to drop into a standard 600 mm suspended ceiling grid.
- Perforated with a regular pattern of 1849 circular holes (43 x 43 array), of which 2 lines around the perimeter were not open at the rear, and the remainder (39 x 39) opened into the glass fibre batt behind. Hole size was approx 7 mm at the face, tapering to 6.5 mm at the rear, positioned at approx 13 mm spacing.
- Decorative effect of perforations was supplemented by additional moulding details (grooves in the tile face between the perforations, and varying height of facets in between as per photo).
- Open area percentage[4] (estimated): 19.8 % (based on mouth area of all 1849 holes); 14.0 % (based on throat area at rear of holes, of only those holes opening into the fibre batt behind).
- Each tile was fitted with a semi rigid high-density CSR Bradford glass fibre batt, 500 x 500 x 20 mm (approx 42 kg/m³); installed during production of the tile, fixed in place by way of plaster skim-coat around the perimeter of the batt; the majority of the batt remaining open and exposed to the cavity.

Installation

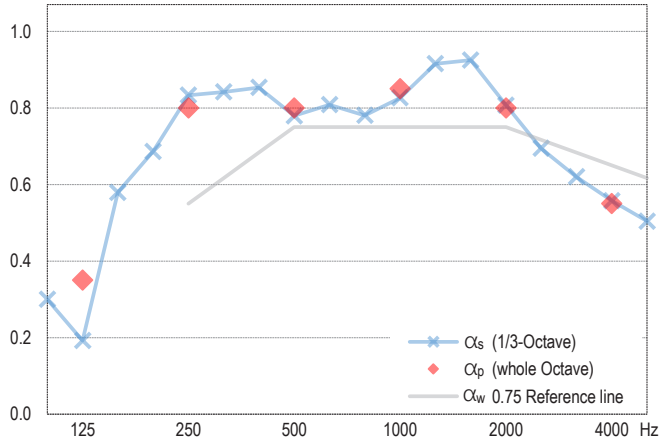
- The test specimen was installed as an upside-down ceiling on the floor of the chamber.
- A 200 mm deep enclosure (32 mm MDF timber, approx 23 kg/m², built to surround an area of 3600 x 3000 mm) was placed on the floor of the chamber at an 11° angle to the chamber walls (not parallel, as per AS ISO 354 cl6.2.1.2). The enclosure consisted of two 100 mm deep modules, stacked to create the E-200 enclosure. The junctions of the enclosure modules to each other, to the floor, and to the tile array were all taped.
- A system of plastic support feet sitting on aluminium extrusions (upside-down Tees) was set up inside the enclosure to support the tiles with their exposed face nominally flush with the enclosure. The cavity behind was a single undivided cavity without internal partitions.
- Tiles were arranged in a 6 x 5 array on the support system, then a full grid of main and cross tees was placed on top to cover the gaps between the tiles, matching a normal ceiling installation.
- Specimen installation was carried out by laboratory staff.

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

Tile details – Left: whole tile, Right: close-up view

Measurement Details & Results

Freq	Absorption coefficients			Reverberation times, T_{60} (sec)	
Hz	α_s	α_p	95% Conf (δ)	Empty room	with Specimen
100	0.30		0.06	5.37	3.50
125	0.19	0.35	0.07	5.82	4.25
160	0.58		0.11	6.41	2.87
200	0.69		0.10	5.76	2.49
250	0.83	0.80	0.07	4.85	2.07
315	0.84		0.07	6.01	2.24
400	0.85		0.06	5.84	2.20
500	0.78	0.80	0.05	5.45	2.26
630	0.81		0.05	5.17	2.17
800	0.78		0.04	4.97	2.17
1000	0.83	0.85	0.04	4.87	2.09
1250	0.92		0.04	4.35	1.88
1600	0.92		0.04	3.95	1.79
2000	0.81	0.80	0.04	3.58	1.83
2500	0.69		0.03	3.22	1.85
3150	0.62		0.04	2.92	1.83
4000	0.56	0.55	0.03	2.49	1.71
5000	0.50		0.04	2.09	1.56



Performance Indices[1,2]

α_w = 0.75 (L)
SAA = 0.81
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:	10 Feb 2021	10 Feb 2021
Temperature & humidity:	24 °C, 59 % R.H.	22 °C, 63 % R.H.
Atmospheric pressure:	999 mBar	1000 mBar

Notes, Deviations etc

1. Shape indicators (L, M, and H), if any, following the α_w index, indicate α_p 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. Open area estimates are based on 600 x 600 mm of ceiling area being 'treated' by each tile.

Issuing Authority

Signed: .....
David Truett
Date: 24 February 2021

Instrumentation

Real time analyser: • Brüel & Kjær PULSE LAN-XI type 3160-A-4/2
Microphones/preamps: • 4 microphones (1 x B&K 4134, 1 x B&K 4166, and 2 x GRAS 40AR) on B&K and GRAS preamps, in fixed positions as per AS ISO 354
Noise source: • Room populated with three dodecahedron loudspeakers; (2 x 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 a MDF/Plasterboard composite wall) • parallelepiped with dimensional proportions 1:1.3:1.6 for distribution of room modes • approx 202 m³ total room volume • approx 215 m² surface area excluding diffusers
Diffusers: • 20 stationary diffusers, approx 40 m² total surface area
Absorption area: • in accordance with AS ISO 354, unless noted otherwise

ACOUSTIC LABORATORIES AUSTRALIA PTY LTD

Unit 3/2 Hardy Street
South Perth 6151
Tel: 9474 4477
Fax: 9474 5977

AIRBORNE SOUND ATTENUATION BETWEEN ROOMS SHARING COMMON CEILING PLENUM

Client: Australian Plaster Acoustics
ALA Test No.: **20-093-1**
Specimen: New Shadex Plaster Acoustic Tile
Detail: Polyester Insulation

Description of Specimen:

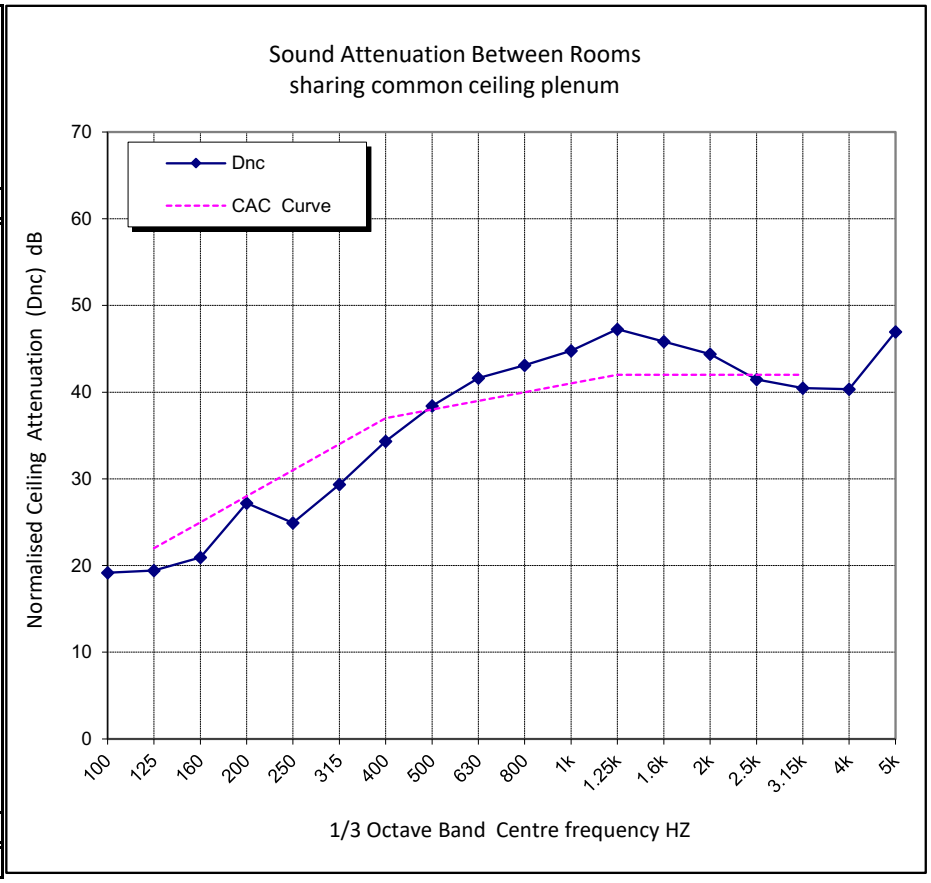
New Shadex Tile, Tegular Edge 600 x 600 X 28mm thick Plaster Acoustic Tile
25mm Polyester insulation @ 32 kg/m3; compressed to 20mm
Tile is perforate with 7mm holes at 13mm centres
This provides 22% open area in perforation, 19% in Tile
Skim coat plaster over large percetage of holes
Rondo Duo 2, Exposed 24mm Main and Cross Tee bar grid
Ceiling continuous over Partition Cap

Meas. Date: 27-Aug-20

Test Standard:
ASTM E1414 / E1414M - 16

CEILING ATTENUATION CLASS **CAC 38**

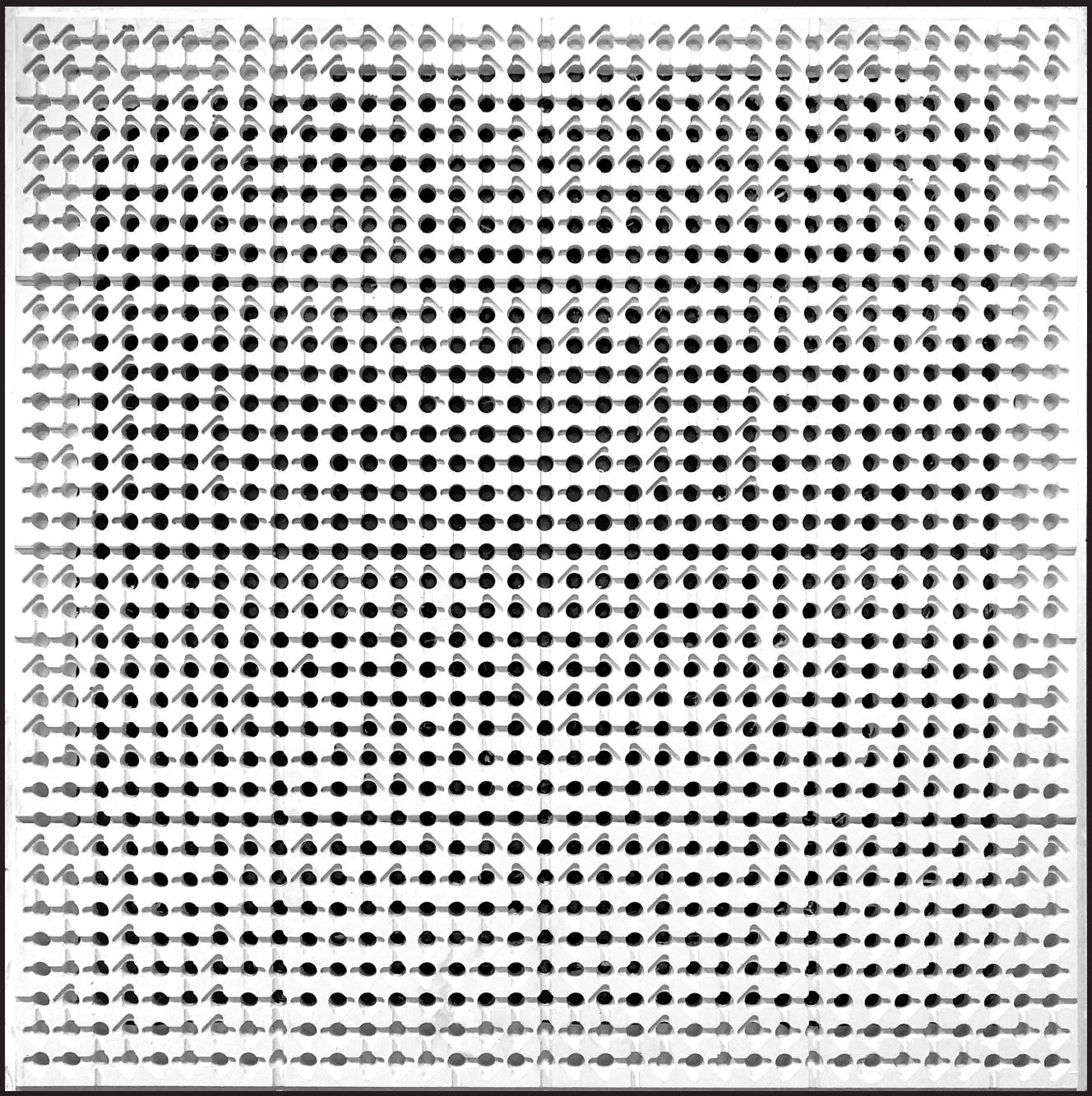
Centre Frequency	Dnc	CAC Curve	Deficiencies
Hz	dB	dB	dB
100	**19**		
125	**19**	22	2.6
160	**21**	25	4.1
200	**27**	28	0.8
250	**25**	31	6.1
315	**29**	34	4.7
400	**34**	37	2.7
500	**38**	38	
630	**42**	39	
800	**43**	40	
1k	**45**	41	
1.25k	**47**	42	
1.6k	**46**	42	
2k	**44**	42	
2.5k	**41**	42	0.5
3.15k	**40**	42	1.5
4k	**40**	42	1.7
5k	**47**		
			Total
CAC	**38**		24.6



This Data Sheet must only be read in conjunction with full report

TEST RESULTS

INTERFACE 2020



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: **AC287-04-1**

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

Measurement Type: Sound Absorption

AS ISO 354–2006 [R2016]: *Acoustics–Measurement of sound absorption in a reverberation room*
AS ISO 11654–2002 [R2016] (ISO 11654:1997): *Acoustics–Rating of sound absorption–Materials and systems*

Test Specimen

[Specimen area: 3.6 x 3.0 m (10.8 m²)]

Description: • Bailey "New Interface 2020" drop-in ceiling tiles, • in 600 mm grid,
• with integral glass fibre batts, exposed at rear to the cavity airspace (Type E-200)

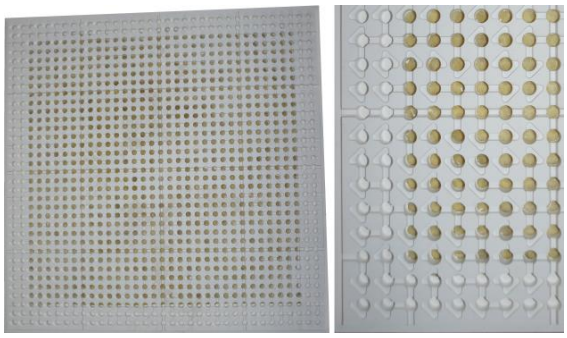
Tile Details[3]

- Moulded plaster ceiling tiles designed to drop into a standard 600 mm suspended ceiling grid.
- Perforated with a regular pattern of 1225 circular holes (35 x 35 array), of which 2 lines around the perimeter were not open at the rear, and the remainder (31 x 31) opened into the glass fibre batt behind. Hole size was approx 10 mm at the face, tapering to 9 mm at the rear, positioned at approx 16 mm spacing.
- Decorative effect of perforations was supplemented by additional moulding details (grooves in the tile face between and around the perforations).
- Open area percentage[4] (estimated): 26.7 % (based on mouth area of all 1225 holes); 17.0 % (based on throat area at rear of holes, of only those holes opening into the fibre batt behind).
- Each tile was fitted with a semi rigid high-density CSR Bradford glass fibre batt, 500 x 500 x 20 mm (approx 42 kg/m³); installed during production of the tile, fixed in place by way of plaster skim-coat around the perimeter of the batt; the majority of the batt remaining open and exposed to the cavity.

Installation

- The test specimen was installed as an upside-down ceiling on the floor of the chamber.
- A 200 mm deep enclosure (32 mm MDF timber, approx 23 kg/m², built to surround an area of 3600 x 3000 mm) was placed on the floor of the chamber at an 11° angle to the chamber walls (not parallel, as per AS ISO 354 cl6.2.1.2). The enclosure consisted of two 100 mm deep modules, stacked to create the E-200 enclosure. The junctions of the enclosure modules to each other, to the floor, and to the tile array were all taped.
- A system of plastic support feet sitting on aluminium extrusions (upside-down Tees) was set up inside the enclosure to support the tiles with their exposed face nominally flush with the enclosure. The cavity behind was a single undivided cavity without internal partitions.
- Tiles were arranged in a 6 x 5 array on the support system, then a full grid of main and cross tees was placed on top to cover the gaps between the tiles, matching a normal ceiling installation.
- Specimen installation was carried out by laboratory staff.

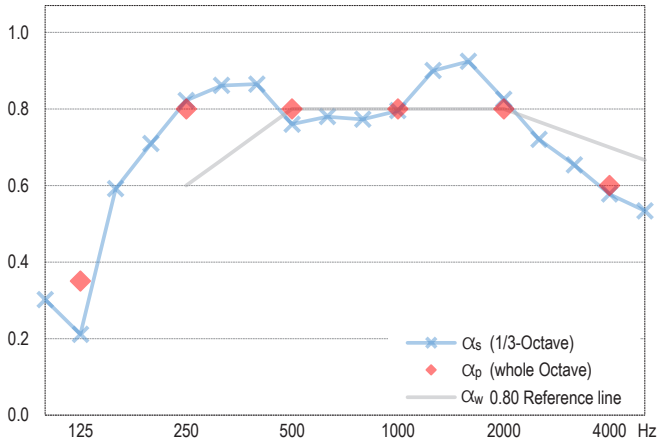
Test specimen installed for testing (image inverted to depict ceiling installation)



Tile details – Left: whole tile, Right: close-up view

Measurement Details & Results

Freq	Absorption coefficients			Reverberation times, T_{60} (sec)	
Hz	α_s	α_p	95% Conf (δ)	Empty room	with Specimen
100	0.30		0.08	5.37	3.49
125	0.21	0.35	0.07	5.82	4.13
160	0.59		0.10	6.41	2.83
200	0.71		0.12	5.76	2.44
250	0.82	0.80	0.08	4.85	2.08
315	0.86		0.06	6.01	2.20
400	0.86		0.07	5.84	2.18
500	0.76	0.80	0.06	5.45	2.29
630	0.78		0.06	5.17	2.21
800	0.77		0.04	4.97	2.18
1000	0.80	0.80	0.04	4.87	2.13
1250	0.90		0.05	4.35	1.89
1600	0.92		0.05	3.95	1.78
2000	0.83	0.80	0.04	3.58	1.81
2500	0.72		0.03	3.22	1.82
3150	0.65		0.03	2.92	1.79
4000	0.58	0.60	0.03	2.49	1.69
5000	0.53		0.03	2.09	1.53



Performance Indices[1,2]

α_w = 0.80
SAA = 0.81
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:	10 Feb 2021	10 Feb 2021
Temperature & humidity:	24 °C, 59 % R.H.	23 °C, 60 % R.H.
Atmospheric pressure:	999 mBar	1000 mBar

Notes, Deviations etc

1. Shape indicators (L, M, and H), if any, following the α_w index, indicate α_p 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. Open area estimates are based on 600 x 600 mm of ceiling area being 'treated' by each tile.

Issuing Authority

Signed: .....
David Truett
Date: 24 February 2021

Instrumentation

Real time analyser: • Brüel & Kjær PULSE LAN-XI type 3160-A-4/2
Microphones/preamps: • 4 microphones (1 x B&K 4134, 1 x B&K 4166, and 2 x GRAS 40AR) on B&K and GRAS preamps, in fixed positions as per AS ISO 354
Noise source: • Room populated with three dodecahedron loudspeakers; (2 x 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 a MDF/Plasterboard composite wall) • parallelepiped with dimensional proportions 1:1.3:1.6 for distribution of room modes • approx 202 m³ total room volume • approx 215 m² surface area excluding diffusers
Diffusers: • 20 stationary diffusers, approx 40 m² total surface area
Absorption area: • in accordance with AS ISO 354, unless noted otherwise

ACOUSTIC LABORATORIES AUSTRALIA PTY LTD

Unit 3/2 Hardy Street
South Perth 6151
Tel: 9474 4477
Fax: 9474 5977

AIRBORNE SOUND ATTENUATION BETWEEN ROOMS SHARING COMMON CEILING PLENUM

Client: Australian Plaster Acoustics
ALA Test No.: **20-093-2**
Specimen: Interface 2020 Plaster Acoustic Tile
Detail: Polyester Insulation

Description of Specimen:

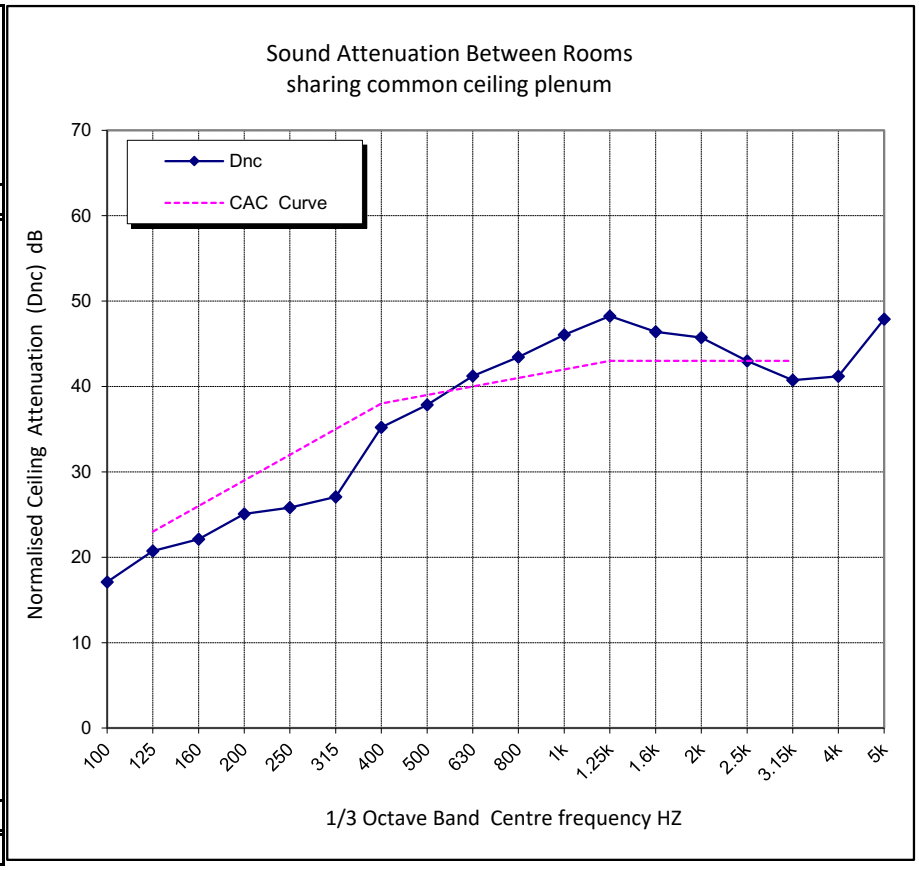
Interface 2020 Tile, Tegular Edge 600 x 600 X 28mm thick Plaster Acoustic Tile
25mm Polyester insulation @ 32 kg/m3; compressed to 20mm
9mm holes at 16mm centres
24% open area in perforation, 21% in Tile
Skim coat plaster over large percetage of holes
Rondo Duo 2, Exposed 24mm Main and Cross Tee bar grid
Ceiling continuous over Partition Cap

Meas. Date: 31-Aug-20

Test Standard:
ASTM E1414 / E1414M - 16

CEILING ATTENUATION CLASS **CAC 39**

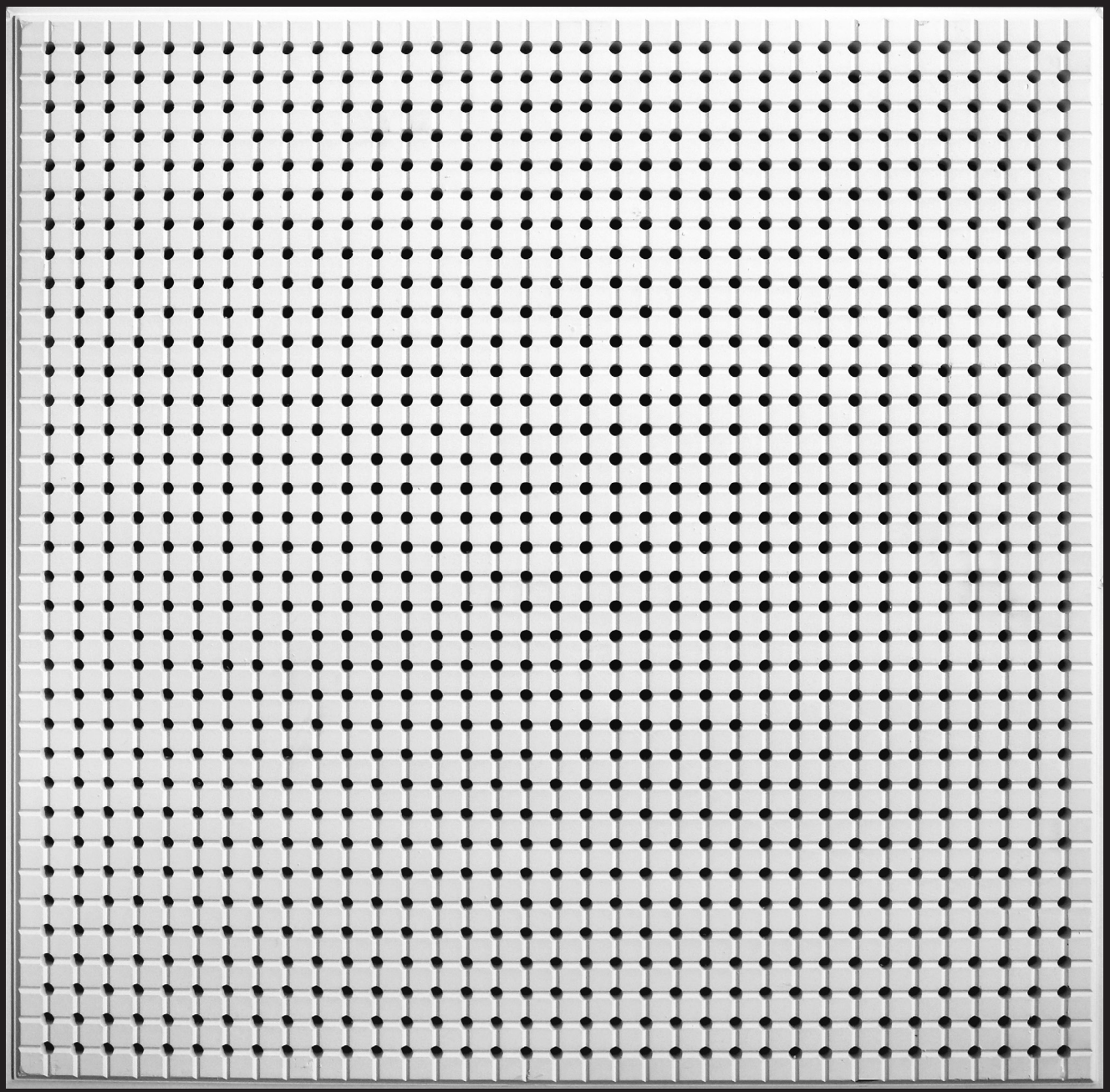
Centre Frequency	Dnc	CAC Curve	Deficiencies
Hz	dB	dB	dB
100	**17**		
125	**21**	23	2.3
160	**22**	26	3.9
200	**25**	29	3.9
250	**26**	32	6.2
315	**27**	35	7.9
400	**35**	38	2.8
500	**38**	39	1.1
630	**41**	40	
800	**43**	41	
1k	**46**	42	
1.25k	**48**	43	
1.6k	**46**	43	
2k	**46**	43	
2.5k	**43**	43	
3.15k	**41**	43	2.3
4k	**41**	43	1.8
5k	**48**		
			Total
CAC	**39**		31.2



This Data Sheet must only be read in conjunction with full report

TEST RESULTS

Hush



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: **AC270-04-1**

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 m²), Test configuration: Type E-400]

Description: • Bailey "Hush" drop-in acoustic ceiling tiles
• with integral glass fibre batt behind, non-encapsulated

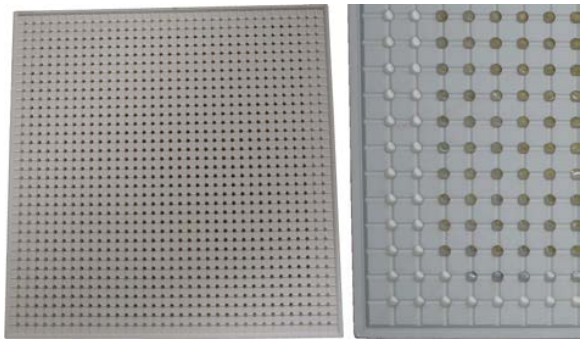
Tile Details[3]

- Perforated moulded plaster ceiling tiles, approx 588 x 588 mm (x 30 mm thick) designed to drop into a standard 600 mm suspended ceiling grid.
- Manufactured with an integral glass fibre batt (Bradford Supertel, 32 kg/m³, 20 mm thick) behind the perforated face, constrained around the perimeter at the rear with plaster skim-coat covering the outer 60 mm of the batt (approx).
- Perforated in a regular pattern of 7.0 mm dia holes (1225 count); the perforations in the vicinity of the perimeter being open only at the face (closed at the rear), with the perforations away from the perimeter being open front and back (exposing the glass fibre batt behind).
- Open area percentage[4] (estimated): 10.5% (only holes open front and back); 13.1% (all holes).
- Decorative effect of perforations supplemented by additional moulding details (grooves between the perforations).

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/m², built to surround an area of 3600 x 3000 mm) was placed on the floor of the chamber, 11° 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 tiles. The cavity behind the panels was a single undivided cavity without internal partitions.
- Specimen tiles were arranged in a 6 x 5 array on the support system.
- Tee sections were placed on top to cover the gaps between adjacent tiles and acoustically mimic a normal ceiling installation. The perimeter of the installed test specimen was taped with masking tape to seal gaps between the tiles and the enclosure.
- Specimen installation was carried out by laboratory staff.

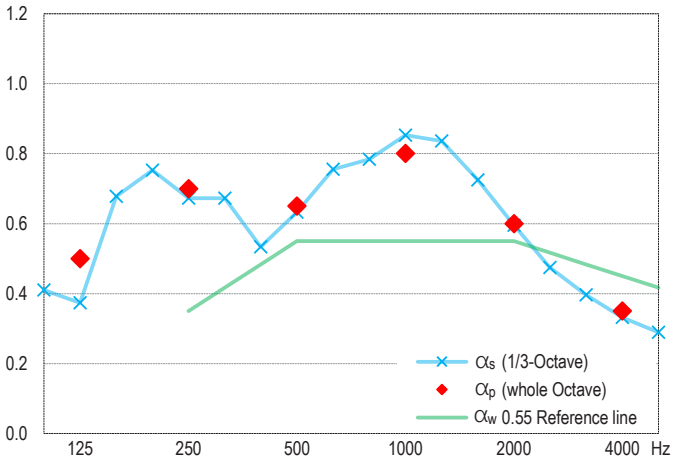
Test specimen installed for testing (image inverted to depict ceiling installation)



Tile details – Left: whole tile, Right: close-up view

Measurement Details & Results

Freq	Absorption coefficients			Reverberation times, T_{60} (sec)	
Hz	α_s	α_p	95% Conf (δ)	Empty room	with Specimen
100	0.41		0.06	5.82	3.23
125	0.37	0.50	0.09	6.86	3.68
160	0.68		0.07	6.59	2.63
200	0.75		0.10	6.43	2.44
250	0.67	0.70	0.06	5.40	2.42
315	0.67		0.05	6.57	2.63
400	0.53		0.04	6.31	2.95
500	0.63	0.65	0.04	5.91	2.61
630	0.75		0.04	5.47	2.29
800	0.78		0.04	5.00	2.16
1000	0.85	0.80	0.04	4.84	2.03
1250	0.84		0.04	4.30	1.96
1600	0.73		0.04	3.93	2.01
2000	0.60	0.60	0.03	3.53	2.07
2500	0.47		0.03	3.22	2.11
3150	0.40		0.03	2.96	2.08
4000	0.33	0.35	0.03	2.58	1.93
5000	0.29		0.03	2.21	1.70



Performance Indices[1,2]
α_w = 0.55 (LM)
SAA = 0.69
NRC = 0.70

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:	15 Jan 2020	15 Jan 2020
Temperature & humidity:	27 °C, 58 % R.H.	28 °C, 43 % R.H.
Atmospheric pressure:	996 mBar	994 mBar

Notes, Deviations etc

1. Shape indicators (L, M, and H), if any, following the α_w index, indicate α_p 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. Open area estimates are based on 600 x 600 mm of ceiling area being 'treated' by each tile.

Issuing Authority

Signed: .....
David Truett
Date: 24 January 2020

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 a plasterboard wall) • parallelepiped with dimensional proportions 1:1.3:1.6 for distribution of room modes • approx 202 m³ total room volume • approx 215 m² surface area excluding diffusers
Diffusers: • 20 stationary diffusers, approx 40 m² total surface area
Absorption area: • in accordance with AS ISO 354, unless noted otherwise

ACOUSTIC LABORATORIES AUSTRALIA PTY LTD

Unit 3/2 Hardy Street
South Perth 6151
Tel: 9474 4477
Fax: 9474 5977

AIRBORNE SOUND ATTENUATION BETWEEN ROOMS SHARING COMMON CEILING PLENUM

ALA Test No.: **16-091-5**
Client: **Australian Plaster Acoustics**
Specimen: Hush Tile- Tegular Edge
Detail: 600 x 600 Plaster Acoustic Tile

Description of Specimen:

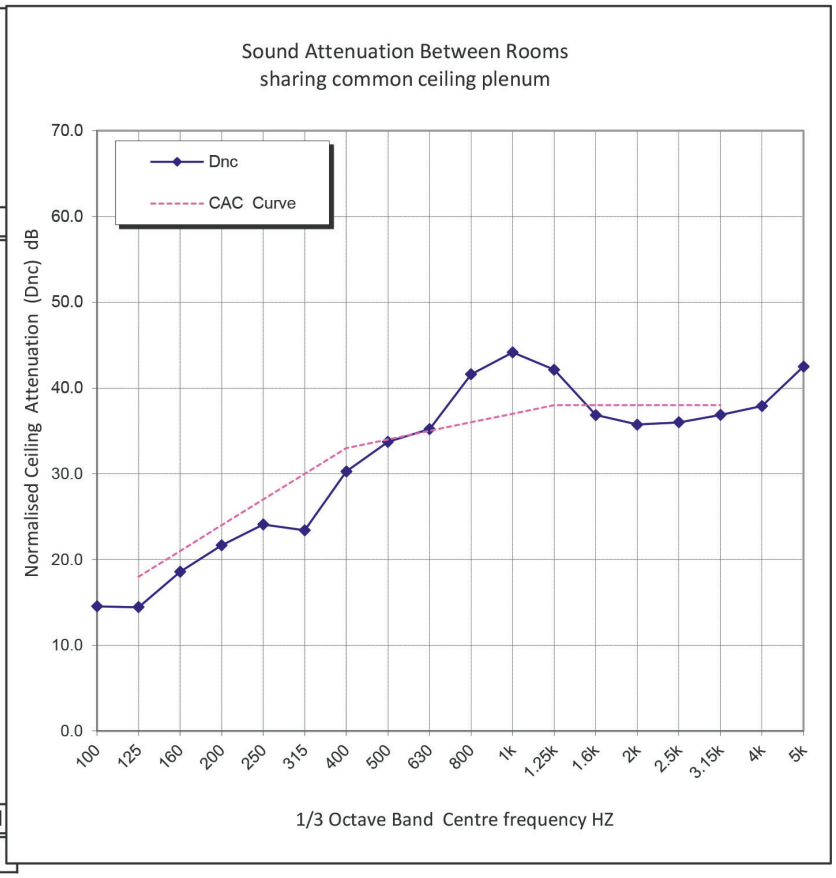
Hush Tile, Tegular Edge 600 x 600 X 28mm Plaster Acoustic Tile
6mm perforated plaster face. Nominal open area 21.4%
25mm glasswool insulation @ 32 kg/m3; compressed to 20mm
Thin 2mm plaster skim coat over insulation to seal tile
Nominal weight per tile 4.5 kg
Lay in Tee Bar grid - Rondo Duo 1 and 2

Meas. Date: 14-Apr-16

Tested in accordance with
ASTM E1414 / E1414M - 11a

CEILING ATTENUATION CLASS **CAC 34**

Centre Frequency	Dnc	CAC Curve	Deficiencies
Hz	dB	dB	dB
100	**14.5**		
125	**14.4**	18	3.6
160	**18.6**	21	2.4
200	**21.7**	24	2.3
250	**24.1**	27	2.9
315	**23.4**	30	6.6
400	**30.3**	33	2.7
500	**33.7**	34	0.3
630	**35.2**	35	
800	**41.6**	36	
1k	**44.2**	37	
1.25k	**42.1**	38	
1.6k	**36.8**	38	1.2
2k	**35.7**	38	2.3
2.5k	**36.0**	38	2.0
3.15k	**36.9**	38	1.1
4k	**37.9**	38	0.1
5k	**42.5**		
			Total
CAC	**34**		27.5



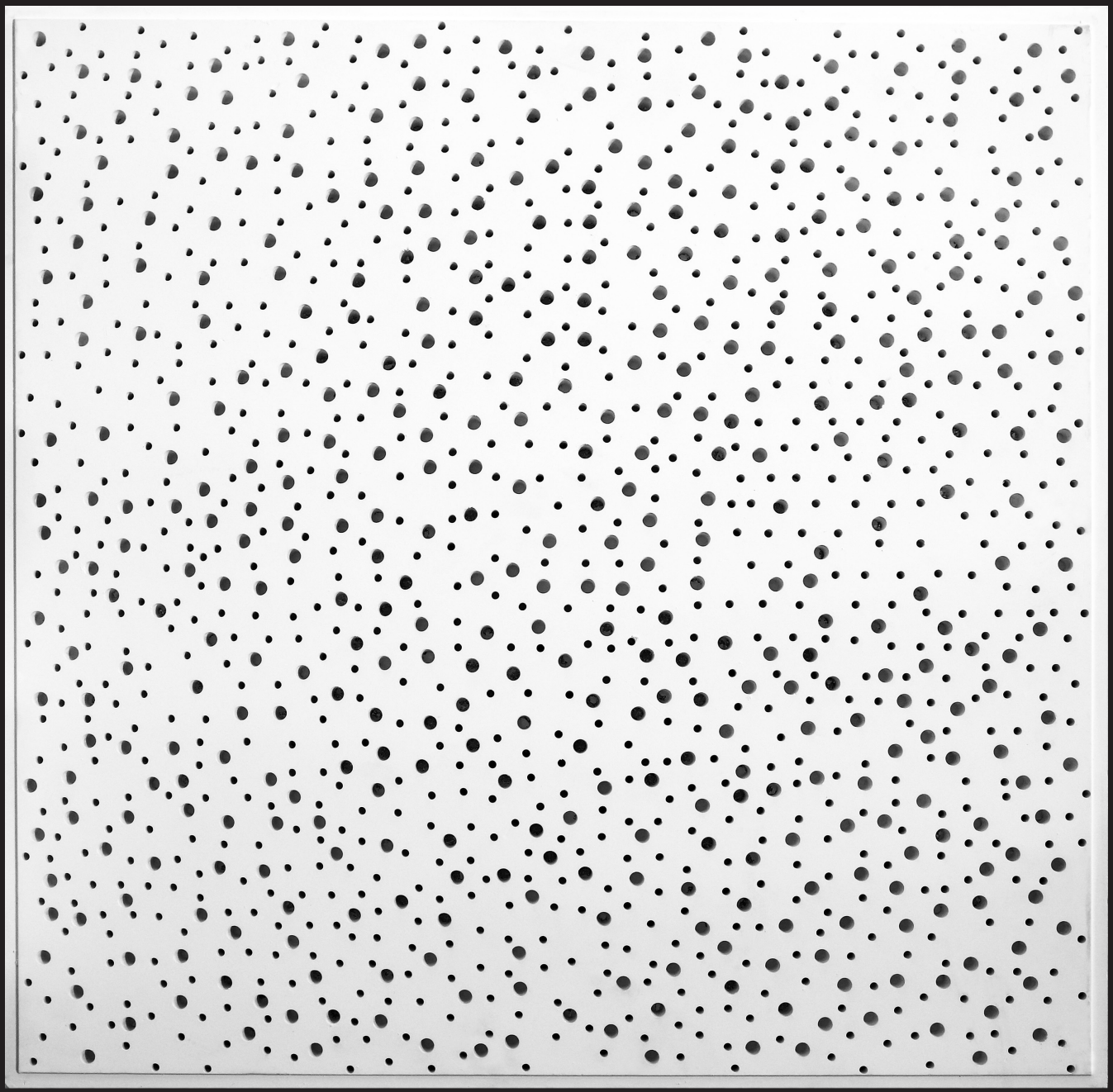
Signatory:
Tester: N Gabriels B.Arch, FAAS

Date: 16-Apr-16

Checked: K Hearne B.Arch, MAAS

TEST RESULTS

Random



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: **AC270-01-1**

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 m²), Test configuration: Type E-400]

Description: • Bailey "Random" drop-in acoustic ceiling tiles
• with integral glass fibre batt behind, non-encapsulated

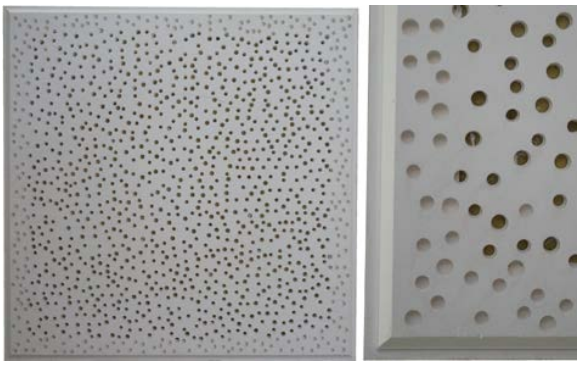
Tile Details[3]

- Perforated moulded plaster ceiling tiles, approx 588 x 588 mm (x 30 mm thick) designed to drop into a standard 600 mm suspended ceiling grid.
- Manufactured with an integral glass fibre batt (Bradford Supertel, 32 kg/m³, 20 mm thick) behind the perforated face, constrained around the perimeter at the rear with plaster skim-coat covering the outer 60 mm of the batt (approx).
- Perforated in a random pattern with a mixture of 6.5 and 8.0 mm dia holes (approx 880 and 440 of each size respectively); the perforations in the vicinity of the perimeter being open only at the face (closed at the rear), with the perforations away from the perimeter being open front and back (exposing the glass fibre batt behind).
- Open area percentage[4] (estimated): 11.5% (only holes open front and back); 14.3% (all holes).

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/m², built to surround an area of 3600 x 3000 mm) was placed on the floor of the chamber, 11° 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 tiles. The cavity behind the panels was a single undivided cavity without internal partitions.
- Specimen tiles were arranged in a 6 x 5 array on the support system.
- Tee sections were placed on top to cover the gaps between adjacent tiles and acoustically mimic a normal ceiling installation. The perimeter of the installed test specimen was taped with masking tape to seal gaps between the tiles and the enclosure.
- Specimen installation was carried out by laboratory staff.

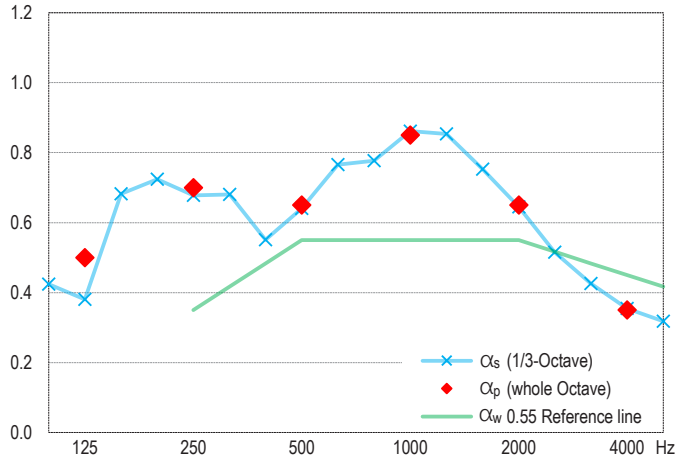
Test specimen installed for testing (image inverted to depict ceiling installation)



Tile details – Left: whole tile, Right: close-up view

Measurement Details & Results

Freq	Absorption coefficients			Reverberation times, T_{60} (sec)	
Hz	α_s	α_p	95% Conf (δ)	Empty room	with Specimen
100	0.42		0.07	5.82	3.18
125	0.38	0.50	0.08	6.86	3.66
160	0.68		0.08	6.59	2.62
200	0.72		0.12	6.43	2.51
250	0.68	0.70	0.06	5.40	2.42
315	0.68		0.05	6.57	2.62
400	0.55		0.04	6.31	2.91
500	0.64	0.65	0.04	5.91	2.61
630	0.77		0.05	5.47	2.28
800	0.78		0.04	5.00	2.19
1000	0.86	0.85	0.04	4.84	2.04
1250	0.85		0.03	4.30	1.95
1600	0.75		0.03	3.93	1.99
2000	0.64	0.65	0.03	3.53	2.01
2500	0.52		0.03	3.22	2.06
3150	0.43		0.03	2.96	2.03
4000	0.35	0.35	0.03	2.58	1.88
5000	0.32		0.03	2.21	1.65



Performance Indices[1,2]
α_w = 0.55 (LM)
SAA = 0.70
NRC = 0.70

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:	15 Jan 2020	15 Jan 2020
Temperature & humidity:	27 °C, 58 % R.H.	26 °C, 43 % R.H.
Atmospheric pressure:	996 mBar	996 mBar

Notes, Deviations etc

1. Shape indicators (L, M, and H), if any, following the α_w index, indicate α_p 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. Open area estimates are based on 600 x 600 mm of ceiling area being 'treated' by each tile.

Issuing Authority

Signed: .....
David Truett
Date: 24 January 2020

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 a plasterboard wall) • parallelepiped with dimensional proportions 1:1.3:1.6 for distribution of room modes • approx 202 m³ total room volume • approx 215 m² surface area excluding diffusers
Diffusers: • 20 stationary diffusers, approx 40 m² total surface area
Absorption area: • in accordance with AS ISO 354, unless noted otherwise

ACOUSTIC LABORATORIES AUSTRALIA PTY LTD

Unit 3/2 Hardy Street
South Perth 6151
Tel: 9474 4477
Fax: 9474 5977

AIRBORNE SOUND ATTENUATION BETWEEN ROOMS SHARING COMMON CEILING PLENUM

ALA Test No.: **16-095-1**
Client: **Australian Plaster Acoustics**
Specimen: Random Tile
Detail: 600 x 600 Plaster Acoustic Tile

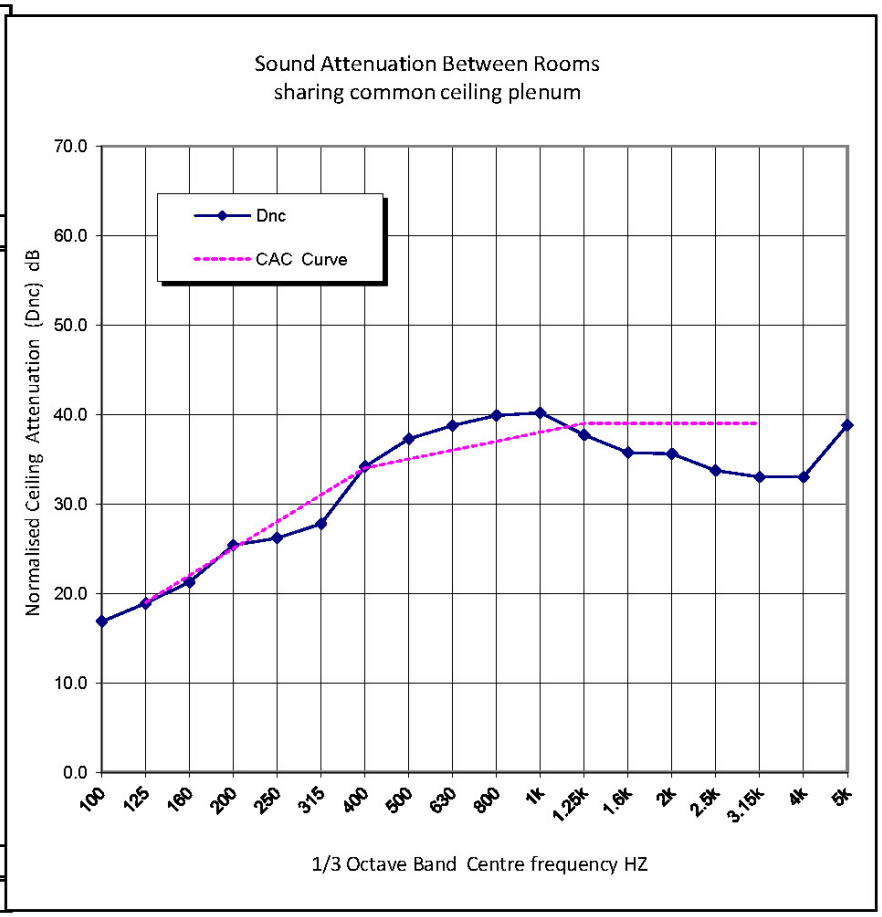
Description of Specimen:
Random Tile, Tegular Edge 600 x 600 X 28mm thick Plaster Acoustic Tile
Nominal open area 10.5%
25mm polyerster insulation @ 32 kg/m3; compressed to 20mm
Thin 2mm plaster skim coat over insulation to seal tile
Nominal weight per tile 4.5 kg
Lay in Tee Bar grid

Meas. Date: 09-Aug-16

Tested in accordance with
ASTM E1414 / E1414M - 11a

CEILING ATTENUATION CLASS **CAC** **35**

Centre Frequency	Dnc	CAC Curve	Deficiencies
Hz	dB	dB	dB
100	**16.9**		
125	**18.9**	19	0.1
160	**21.3**	22	0.7
200	**25.4**	25	
250	**26.2**	28	1.8
315	**27.8**	31	3.2
400	**34.2**	34	
500	**37.3**	35	
630	**38.7**	36	
800	**39.9**	37	
1k	**40.2**	38	
1.25k	**37.7**	39	1.3
1.6k	**35.7**	39	3.3
2k	**35.6**	39	3.4
2.5k	**33.7**	39	5.3
3.15k	**33.0**	39	6.0
4k	**33.0**	39	6.0
5k	**38.8**		
			Total
CAC	**35**		31.2



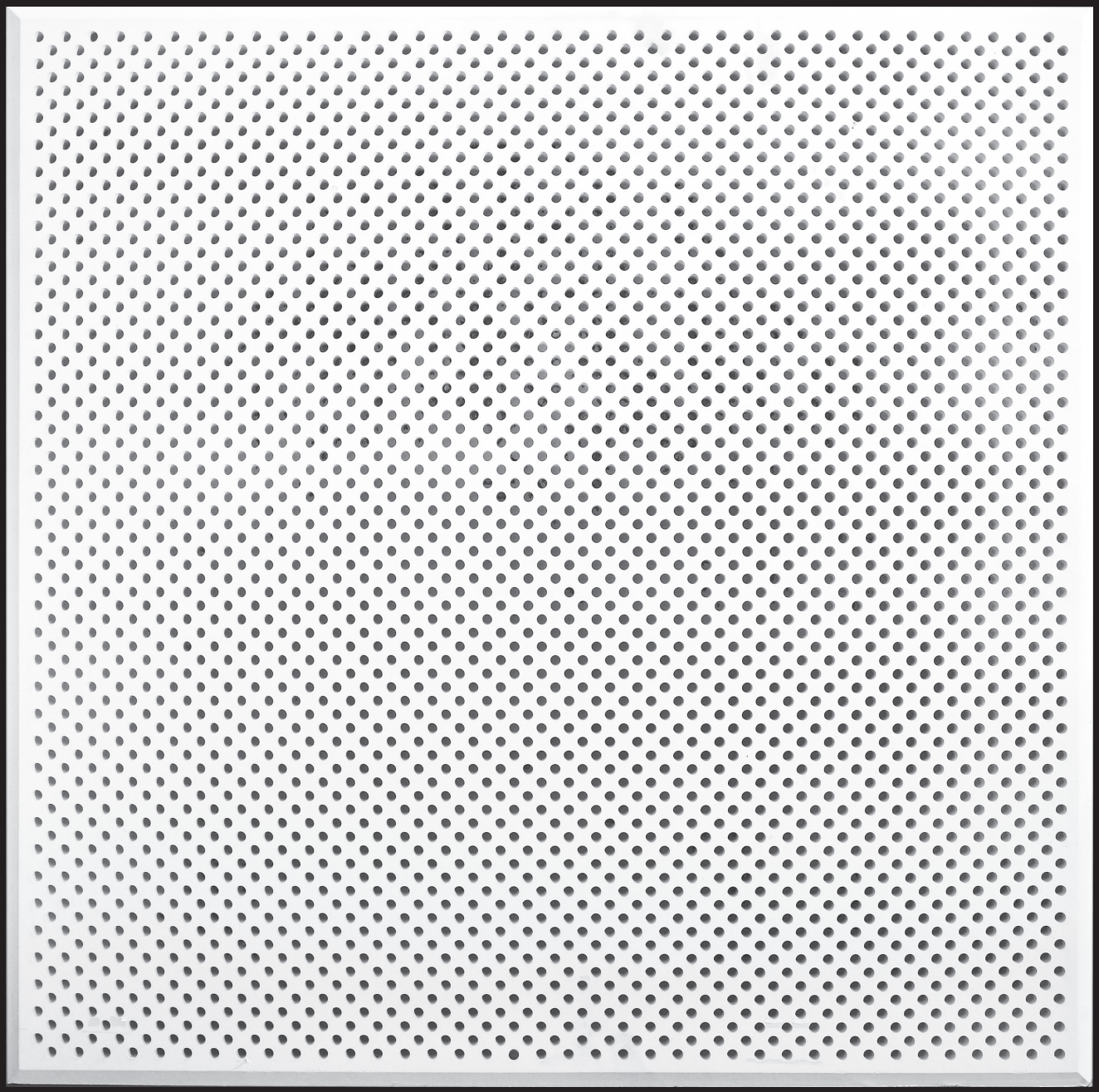
Signatory:
Tester: N Gabriels B.Arch, FAAS

Date: 11-Aug-16

Kingsley Hearne
Checked: K Hearne B.Arch, MAAS

TEST RESULTS

EcoCheck Direct Fix



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: **AC270-07-1**

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 m²), Test configuration: Type E-400]

Description: • Bailey "EcoCheck" nail-up acoustic ceiling tiles
• with integral glass fibre batt behind, non-encapsulated

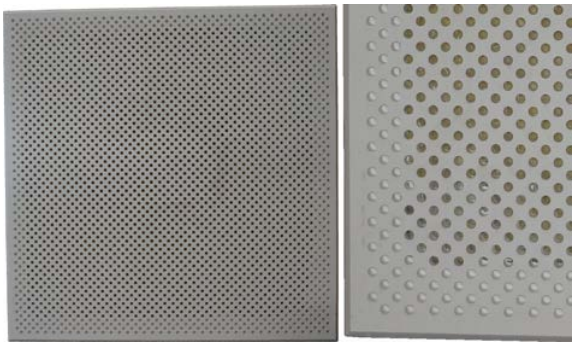
Tile Details[3]

- Perforated moulded plaster ceiling tiles, nominal size 600 x 600 mm (x 30 mm thick) designed to be nail/screw fixed to overhead ceiling battens.
- Manufactured with an integral glass fibre batt (Bradford Supertel, 32 kg/m³, 20 mm thick) behind the perforated face, constrained around the perimeter at the rear with plaster skim-coat covering the outer 60 mm of the batt (approx).
- Perforated in a regular pattern of 6.5 mm dia holes (2888 count); the perforations in the vicinity of the perimeter being open only at the face (closed at the rear), with the perforations away from the perimeter being open front and back (exposing the glass fibre batt behind).
- Open area percentage[4] (estimated): 21.3% (only holes open front and back); 26.6% (all holes).

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/m², built to surround an area of 3600 x 3000 mm) was placed on the floor of the chamber, 11° 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 tiles. The cavity behind the panels was a single undivided cavity without internal partitions.
- Specimen tiles were arranged in a 6 x 5 array on the support system; tiles installed along two of the edges of the enclosure were rasped as required to fit into the 3.6 x 3.0 m enclosure.
- All edges where adjacent tiles met each other and at the perimeter junction with the enclosure, were sealed with PVC electrical tape or paper masking tape.
- Specimen installation was carried out by laboratory staff.

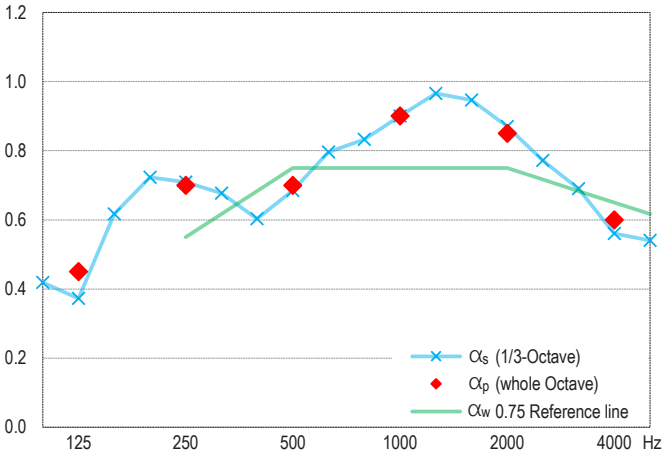
Test specimen installed for testing (image inverted to depict ceiling installation)



Tile details – Left: whole tile, Right: close-up view

Measurement Details & Results

Freq	Absorption coefficients			Reverberation times, T_{60} (sec)	
Hz	α_s	α_p	95% Conf (δ)	Empty room	with Specimen
100	0.42		0.06	5.79	3.20
125	0.37	0.45	0.09	6.74	3.67
160	0.62		0.07	6.43	2.77
200	0.72		0.07	6.44	2.52
250	0.71	0.70	0.06	5.49	2.39
315	0.68		0.04	6.62	2.65
400	0.60		0.05	6.48	2.81
500	0.68	0.70	0.05	6.08	2.54
630	0.80		0.06	5.65	2.26
800	0.83		0.05	5.34	2.15
1000	0.90	0.90	0.03	5.12	2.02
1250	0.97		0.06	4.62	1.86
1600	0.95		0.05	4.08	1.78
2000	0.87	0.85	0.04	3.62	1.76
2500	0.77		0.04	3.22	1.76
3150	0.69		0.04	2.83	1.71
4000	0.56	0.60	0.03	2.36	1.62
5000	0.54		0.04	1.93	1.42



Performance Indices[1,2]
α_w = 0.75
SAA = 0.79
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:	16 Jan 2020	16 Jan 2020
Temperature & humidity:	22 °C, 46 % R.H.	23 °C, 44 % R.H.
Atmospheric pressure:	1001 mBar	1001 mBar

Notes, Deviations etc

1. Shape indicators (L, M, and H), if any, following the α_w index, indicate α_p 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. Open area estimates are based on 600 x 600 mm of ceiling area being 'treated' by each tile.

Issuing Authority

Signed: .....
David Truett
Date: 24 January 2020

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 a plasterboard wall) • parallelepiped with dimensional proportions 1:1.3:1.6 for distribution of room modes • approx 202 m³ total room volume • approx 215 m² surface area excluding diffusers
Diffusers: • 20 stationary diffusers, approx 40 m² total surface area
Absorption area: • in accordance with AS ISO 354, unless noted otherwise

ACOUSTIC LABORATORIES AUSTRALIA PTY LTD

Unit 3/2 Hardy Street
South Perth 6151
Tel: 9474 4477
Fax: 9474 5977

Airborne Sound Attenuation between Rooms Sharing Common Ceiling Plenum

ALA Test No.: 15-086-2
Project: Bailey Interiors
Specimen: Echo-Check Nail Up.
Detail: CAC Measurement

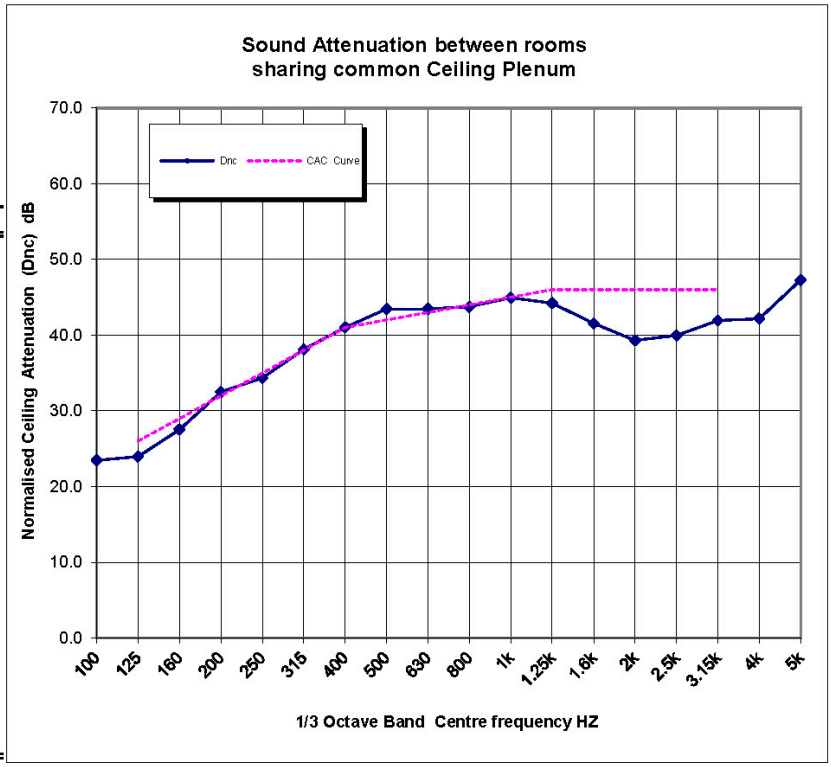
Description of Specimen:
Echo-Check 600 x 600 X 28mm thick Plaster Acoustic Tile
25mm glasswool insulation @ 32 kg/m3; compressed to 20mm
Thin plaster skim coat over insulation to seal tile
Sides of tile, screw fixed to furring chennels
Opposite enbds of tile are lapped to control acoustic Leakage
6mm round holes with nominal open area 8.7%
Nominal surface density 14.4 kg/m2

Meas. Date: 02-Apr-15

Tested in accordance with
ASTM E1414 / E1414M - 11a

CEILING ATTENUATION CLASS **CAC** **42**

Centre Frequency	Dnc	CAC Curve	Deficiencies
Hz	dB	dB	dB
100	**23.5**		
125	**24.0**	26	2.0
160	**27.6**	29	1.4
200	**32.5**	32	
250	**34.3**	35	0.7
315	**38.1**	38	
400	**41.0**	41	
500	**43.4**	42	
630	**43.5**	43	
800	**43.7**	44	0.3
1k	**44.9**	45	0.1
1.25k	**44.2**	46	1.8
1.6k	**41.5**	46	4.5
2k	**39.3**	46	6.7
2.5k	**40.0**	46	6.0
3.15k	**41.9**	46	4.1
4k	**42.2**	46	3.8
5k	**47.3**		
			Total
CAC	**42**		31.3



Signatory:
Tester: N Gabriels B.Arch, FAAS

Date: 3-Apr-15

Checked: K Hearne B.Arch, MAAS

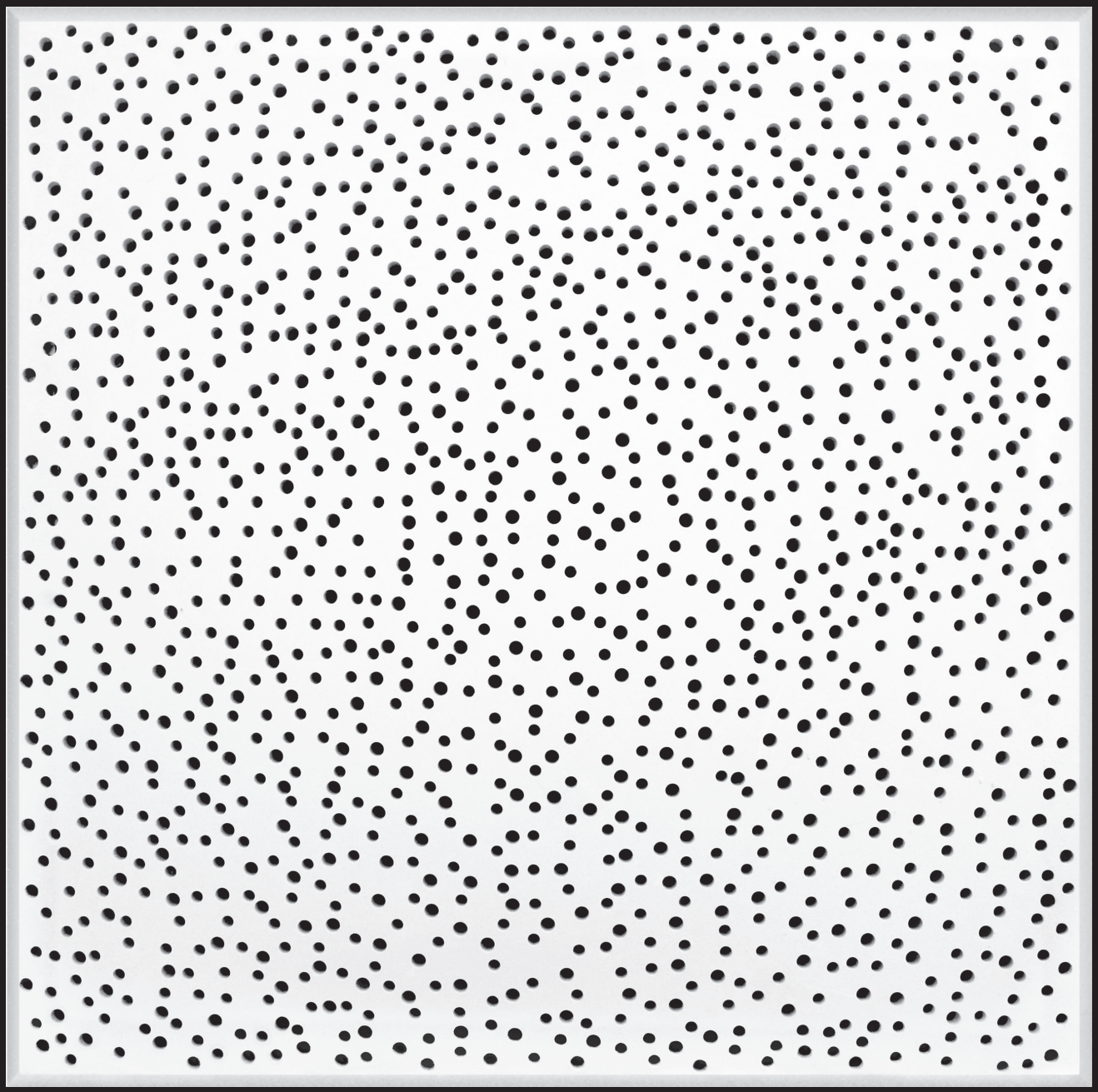
RANDOM DIRECT FIX INSTALLATION

PRIVATE HOME THEATRE

SYDNEY AUSTRALIA

TEST RESULTS

Random Direct Fix



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: **AC270-06-1**

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^2), Test configuration: Type E-400]

Description: • Bailey "Random" nail-up acoustic ceiling tiles
• with integral glass fibre batt behind, non-encapsulated

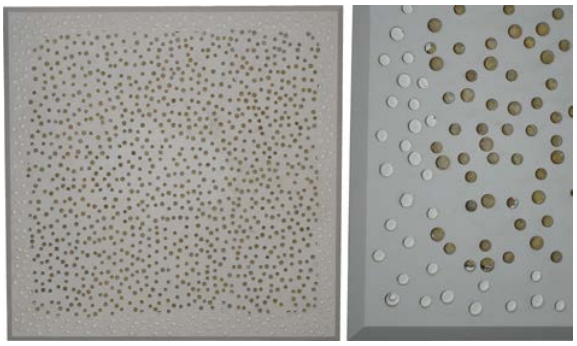
Tile Details[3]

- Perforated moulded plaster ceiling tiles, nominal size 600 x 600 mm (x 30 mm thick) designed to be nail/screw fixed to overhead ceiling battens.
- Manufactured with an integral glass fibre batt (Bradford Supertel, 32 kg/m^3, 20 mm thick) behind the perforated face, constrained around the perimeter at the rear with plaster skim-coat covering the outer 60 mm of the batt (approx).
- Perforated in a random pattern with a mixture of 6.5 and 8.0 mm dia holes (approx 915 and 475 of each size respectively); the perforations in the vicinity of the perimeter being open only at the face (closed at the rear), with the perforations away from the perimeter being open front and back (exposing the glass fibre batt behind).
- Open area percentage[4] (estimated): 12.0% (only holes open front and back); 15.1% (all holes).

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^2, built to surround an area of 3600 x 3000 mm) was placed on the floor of the chamber, 11° 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 tiles. The cavity behind the panels was a single undivided cavity without internal partitions.
- Specimen tiles were arranged in a 6 x 5 array on the support system; tiles installed along two of the edges of the enclosure were rasped as required to fit into the 3.6 x 3.0 m enclosure.
- All edges where adjacent tiles met each other and at the perimeter junction with the enclosure, were sealed with PVC electrical tape or paper masking tape.
- Specimen installation was carried out by laboratory staff.

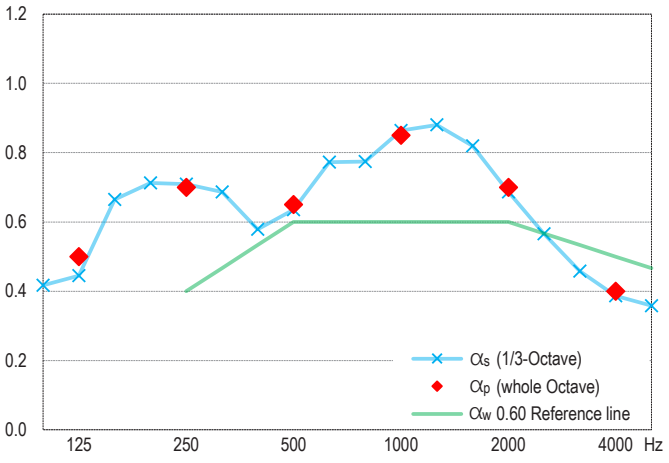
Test specimen installed for testing (image inverted to depict ceiling installation)



Tile details – Left: whole tile, Right: close-up view

Measurement Details & Results

Freq	Absorption coefficients			Reverberation times, T_{60} (sec)	
Hz	α_s	α_p	95% Conf (δ)	Empty room	with Specimen
100	0.42		0.07	5.82	3.20
125	0.44	0.50	0.07	6.86	3.38
160	0.66		0.06	6.59	2.66
200	0.71		0.08	6.43	2.52
250	0.71	0.70	0.07	5.40	2.35
315	0.69		0.05	6.57	2.60
400	0.58		0.04	6.31	2.82
500	0.64	0.65	0.04	5.91	2.60
630	0.77		0.06	5.47	2.25
800	0.77		0.03	5.00	2.17
1000	0.86	0.85	0.04	4.84	2.01
1250	0.88		0.04	4.30	1.89
1600	0.82		0.04	3.93	1.89
2000	0.69	0.70	0.03	3.53	1.94
2500	0.57		0.03	3.22	1.98
3150	0.46		0.03	2.96	2.00
4000	0.39	0.40	0.03	2.58	1.88
5000	0.36		0.03	2.21	1.67



Performance Indices[1,2]
α_w = 0.60 (LM)
SAA = 0.72
NRC = 0.75

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:	15 Jan 2020	15 Jan 2020
Temperature & humidity:	27 °C, 58 % R.H.	28 °C, 46 % R.H.
Atmospheric pressure:	996 mBar	995 mBar

Notes, Deviations etc

1. Shape indicators (L, M, and H), if any, following the α_w index, indicate α_p 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. Open area estimates are based on 600 x 600 mm of ceiling area being 'treated' by each tile.

Issuing Authority

Signed:
David Truett
Date: 24 January 2020

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 a plasterboard wall) • parallelepiped with dimensional proportions 1:1.3:1.6 for distribution of room modes • approx 202 m^3 total room volume • approx 215 m^2 surface area excluding diffusers
Diffusers: • 20 stationary diffusers, approx 40 m^2 total surface area
Absorption area: • in accordance with AS ISO 354, unless noted otherwise

ACOUSTIC LABORATORIES AUSTRALIA PTY LTD

Unit 3/2 Hardy Street
South Perth 6151
Tel: 9474 4477
Fax: 9474 5977

Airborne Sound Attenuation between Rooms Sharing Common Ceiling Plenum

ALA Test No.: 15-086-3
Project: Bailey Interiors
Specimen: Nail-up Random CAC Meas.
Detail: 600 x 600 Plaster Acoustic Tile

Description of Specimen:

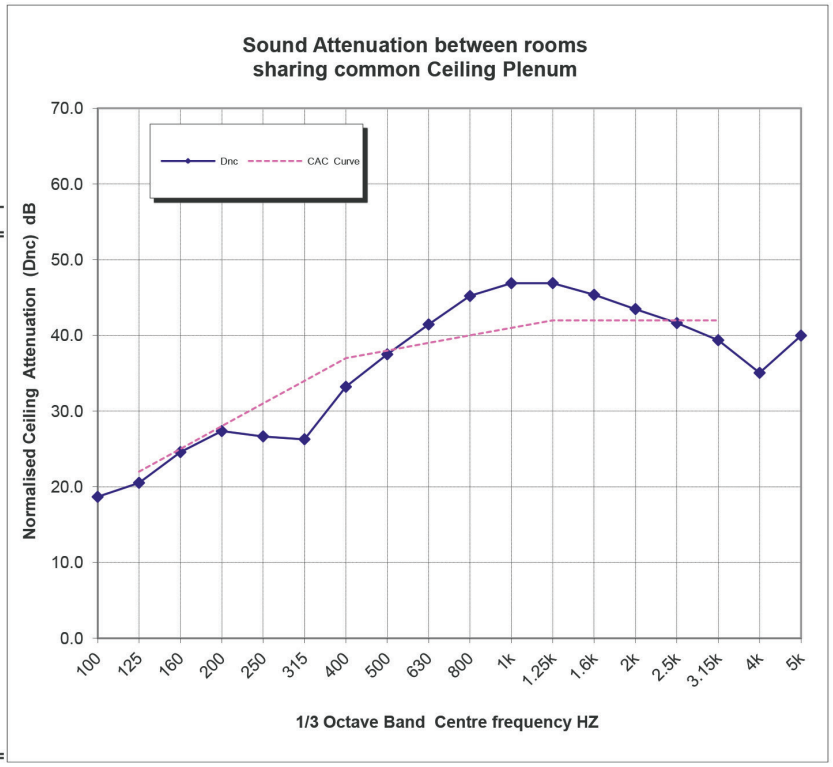
Nail-up Random 'straight edge' 600 x 600 X 28mm thick Plaster Acoustic Tile
25mm glasswool insulation @ 32 kg/m3; compressed to 20mm
Thin plaster skim coat over insulation to seal tile
Sides of tile screw fixed to furring chennels
Plaster Acoustic Tile has Butt joints to ends between furring channels
Nominal open area 8.7%
Nominal surface density 14.4 kg/m2

Meas. Date: 16-Apr-15

Tested in accordance with
ASTM E1414 / E1414M - 11a

CEILING ATTENUATION CLASS **CAC** **38**

Centre Frequency	Dnc	CAC Curve	Deficiencies
Hz	dB	dB	dB
100	**18.7**		
125	**20.5**	22	1.5
160	**24.6**	25	0.4
200	**27.4**	28	0.6
250	**26.7**	31	4.3
315	**26.3**	34	7.7
400	**33.2**	37	3.8
500	**37.5**	38	0.5
630	**41.4**	39	
800	**45.2**	40	
1k	**46.9**	41	
1.25k	**46.9**	42	
1.6k	**45.4**	42	
2k	**43.5**	42	
2.5k	**41.6**	42	0.4
3.15k	**39.4**	42	2.6
4k	**35.1**	42	6.9
5k	**40.0**		
			Total
CAC	**38**		28.8



Signatory:
Tester: N Gabriels B.Arch, FAAS

Date: 18-Apr-15

Kingsley Hearne
Checked: K Hearne B.Arch, MAAS

AWTA PRODUCT TESTING

TEST REPORTS

AWTA PRODUCT TESTING

Australian Wool Testing Authority Ltd - trading as AWTA Product Testing
A.B.N 43 006 014 106
1st Floor, 191 Racecourse Road, Flemington, Victoria 3031
P.O Box 240, North Melbourne, Victoria 3051
Phone (03) 9371 2400 Fax (03) 9371 2499

TEST REPORT

Client : Bailey Interiors
83-85 Boundary Road
Mortdale NSW 2223

Test Number : 14-001048
Issue Date : 31/10/2014
Print Date : 1/10/2019

Sample Description
Clients Ref : "New Shadex, Eco Check; Hush Tile; Shadex; Random"
White molded plaster ceiling tiles - pre insulated with glass fibre batt
Colour : White
End Use : Ceiling tiles
Nominal Composition : Plaster/fibreglass

ASTM C518-2010 **Steady-State Thermal Transmission Properties by Means of the Heat Flow Apparatus**

Date of Testing		20/10/2014	
Test Date		27/10/2014	
Test Apparatus		Lasercomp Fox 600	
Sample Orientation		Horizontal	
Mean Test Temperature		23	°C
Temperature Differential		20	°
Estimated uncertainty in results		3.9	
Specimen	1	2	
Specimen Thickness (as received)	40	39	mm
Specimen Thickness (as tested)	40	39	mm
Specimen Density (as tested)	391	403	kg/m³
Test Duration	01:55	02:00	hrs:mins
Measured Heat Flux	26.0	27.8	W/m²
Measured Thermal Conductivity	0.0520	0.0544	W/m.K
Thermal Resistance	0.8	0.7	m²K/W

181403 1202 Page 1 of 1

Accredited for compliance with ISO/IEC 17025 - Testing
- Chemical Testing : Accreditation No. 983
- Mechanical Testing : Accreditation No. 985
- Performance & Approvals Testing : Accreditation No. 1356

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APPROVED SIGNATORY

MICHAEL A. JACKSON B.Sc.(Hons)
MANAGING DIRECTOR

0204/11/06

AWTA PRODUCT TESTING

Australian Wool Testing Authority Ltd - trading as AWTA Product Testing
A.B.N 43 006 014 106
1st Floor, 191 Racecourse Road, Flemington, Victoria 3031
P.O Box 240, North Melbourne, Victoria 3051
Phone (03) 9371 2400 Fax (03) 9371 2499

TEST REPORT

Client : Bailey Interiors
83-85 Boundary Road
Mortdale NSW 2223

Test Number : 15-002457
Issue Date : 09/06/2015
Print Date : 29/06/2018

Replacement of Report dated :08/05/2018

Sample Description

Clients Ref : "Shadex; Hush; Eco Check; New Shadex; Random; Casino; Open Cell; NUTR 2000 Super Diamond; Open Slot; Moon""
White molded plaster ceiling tiles
Colour : White
End Use : Acoustic paneling
Nominal Composition : Plaster
Nominal Thickness : 28mm

ISO 5660.1-2002 Reaction to Fire Tests - Heat Release Smoke Production and Mass Loss Rate Part 1: Heat Release Rate (Cone Calorimeter Method)

	Specimen 1	2	3	Mean	
Average Heat Release Rate	fti	fti	fti	fti	kW/m²
Group Number Classification	1	1	1		

(In Accordance with New Zealand Building Code Verification Method C/VM2 Appendix A)

Average Specific extinction area	0.2	0.1	1.4	0.6	m²/kg

Test orientation : Horizontal

	Specimen 1	2	3	Mean	
Irradiance	50	50	50	50	kW/m²
Exhaust flow rate	24	24	24	24	L/sec
Time to sustained flaming	fti	fti	fti	fti	sec
Test duration	1800	1800	1800	1800	sec

15644 5140

Accredited for compliance with ISO/IEC 17025 - Testing
- Chemical Testing : Accreditation No. 983
- Mechanical Testing : Accreditation No. 985
- Performance & Approvals Testing : Accreditation No. 1356

APPROVED SIGNATORY

MICHAEL A. JACKSON B.Sc.(Hons)
MANAGING DIRECTOR

0204/11/06

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A.B.N 43 006 014 106
1st Floor, 191 Racecourse Road, Flemington, Victoria 3031
P.O Box 240, North Melbourne, Victoria 3051
Phone (03) 9371 2400

TEST REPORT

Client : Bailey Interiors
83-85 Boundary Road
Mortdale NSW 2223

Test Number : 19-007603
Issue Date : 4/02/2020
Print Date : 4/02/2020

Sample Description Clients Ref : "Shadex, Hush,Eco Check,New Shades, Random, Casino,Open Cell, Nut R2000, Super Diamond, OpenSlot,Moon"
Moulded Plaster Ceiling Tiles

Dimensional Stability

Date of Testing 04/02/2020

Change In Specimen	Length (%)	Width (%)	Thickness (%)
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
Mean	0.0	0.0	0.0

Tested conditions: 168 hours at 50degC and 95% Relative Humidity
Observation: After exposure no change in dimension and appearance

192823 41504

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AWTA LIMITED

0205/11/06

APPROVED SIGNATORY

MICHAEL A. JACKSON B.Sc.(Hons)
MANAGING DIRECTOR

GABRIELS HEARNE FARRELL

Enquiries: Norbert Gabriels
norbert@gabriels.net.au
Ph (08) 9474 5966

19 November 2019

BAILEY INTERIORS
83 to 85 Boundary Road
Mortdale NSW 2223

Attention: Roger Bailey

EFFECT OF INSULATION OVER PLASTER CEILING TILES

ACOUSTIC OPINION

Dear Roger,

As requested, we provide an acoustic opinion on the improvement in the Ceiling Attenuation Class (CAC) performance of Bailey Interior Plaster Acoustic tiles resultant from an insulation blanket strip located above the ceiling tiles either side of the ceiling height partition wall.

1. BACKGROUND.

As discussed, an acoustic opinion provided by Gabriels Environmental Design dated 27 March 2015 indicated that In 2015, the Acoustic Laboratories Australia Pty Ltd carried out acoustic test of the Room-to-room sound insulation of Plaster Acoustic panels as manufactured by Bailey Interiors. The tests were carried out in accordance with the Australian Standard AS2499:2000, *Acoustics – Measurement of sound insulation in buildings and of building elements – Laboratory measurement of room-to-room airborne sound insulation of a suspended ceiling with a plenum above it.*

The room-to-room sound insulation tests was carried out on a typical Bailey Interior product "Old Shadex" plaster acoustic tile, and a second test was carried out of same ceiling with a 1.8m wide strip of R3.5 Earthwool insulation located both side of the separating wall below the ceiling.

The result of the above tests was a 4 dB improvement in the room-to-room sound insulation performance in terms of the the Weighted Suspended Ceiling Normalised Level ($D_{n,c,w.}$).

Gabriels Hearne Farrell Pty Ltd have been requested by Bailey Interiors to provide an opinion of the expected improvement of providing a 1.8m wide strip of insulation on both sides of the separating partition wall in terms of the Ceiling Attenuation Class (CAC) performance; (ASTM E1414/E1414M – 11a *Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum*).

2. COMPARATIVE TEST PROCEDURES:

The test procedure for the Australian and American Standards are very similar. The laboratory set up at Acoustic Laboratories Australia can be set up to measure in accordance with both standards. The main difference in the two standards is that the Australian standard ($D_{n,c,w.}$) requires acoustic absorption in the ceiling plenum space on the two end plenum walls and one side plenum wall. The American Standard (CAC) requires acoustic absorption on all four plenum walls.

3. ASSESSMENT

The effectiveness of the acoustic absorbent R3.5 Earthwool insulation installed as a 1.8m strip of insulation on both sides of the ceiling height partition wall is to a large extent dependant on the increase in the total absorption in the ceiling void. In the American (CAC) test method there is additional acoustic absorption in the ceiling void plenum space compared to the Australian ($D_{n,c,w'}$) set up. It is therefore expected that the decibel (dB) improvement in sound insulation if tested in accordance with the American Standard would be less than when tested in the Australian standards.

Based on the above, it is our opinion that the improvement in the room-to-room CAC performance if the Bailey Interior "Old Shadex" plaster acoustic tile with strip acoustic absorption on either side of the partition were carried out to American Standard the improvement in Ceiling Attenuation Class (CAC) performance would be in the order of 2 to 3 dB

Conditions

The information given in this opinion represents extrapolation based on laboratory test carried out on Bailey Interiors plaster acoustic tile products. The assessment and opinions expressed refer to the expected comparative laboratory performance of the product when tested and rated in accordance with America Standard ASTM E1414/E1414M – 11a.

The assessment and opinions expressed refer to the expected laboratory performance of the product. It is assumed that when installed in the field the products are installed in accordance with manufacturer's instructions and installed with good workmanship. No allowance is made for flanking transmission and acoustic leakage via the construction, as these are construction and design issues that must be considered in the design and construction of individual projects.

This assessment is only valid for 5 years. It assumes there is no change in the construction of the material systems. This assessment addresses the acoustic performance only.

Where construction systems are to be extensively used, or are required to comply with specific or stringent specification requirements, it is strongly recommended that the product be laboratory tested. It must be noted that an acoustic opinion provides an estimate of performance and that the likely performance is usually within +/- 3 dB of the opinion.

We trust this proposal meets your requirements. Please call if you require any clarifications.

Yours Faithfully

Norbert Gabriels B.Arch F.A.A.S for

GABRIELS HEARNE FARRELL PTY LTD
Member Firm – Association of Australasian Acoustical Consultants

A Unit 3 / 2 Hardy St, SOUTH PERTH WA 6151 **P** (08) 9474 5966
E kingsley @gabriels.net.au **W** gabriels.net.au**M** 0407 470 865

BAILEY Interiors
Architectural Plaster

83 Boundary Road
(PO Box 78)
Mortdale NSW 2223

ABN 36 003 722 665

T 612 9153 9326
F 612 9534 6532
E sales@baileyinteriors.com.au
W www.baileyinteriors.com.au

Northern Territory Government
Department of Infrastructure
Level 5 Highway House
Palmerston Circuit
P O Box 61 Palmerstone N T 0831

Attention: Kurt Leerburg

"ACOUSTIC CEILING PRODUCTS AS PROJECT SPECIFIC FACTORY DIRECT PACKAGES "
"INCLUSIVE GRID WITH WARRANTY"

Australian Plaster Acoustics has been developing these plaster tiles in conjunction with its parent company Bailey Interiors for the last 5 years.

The organisation has a strong commitment to innovation with major research and development programmes resulting in producing outstanding designs that are truly innovative, lightweight exceptionally high acoustic ratings (NRC) (CAC) and R values . The tiles are fire resistant, pre painted with anti mould paint, will not warp or buckle under humid conditions.

Big innovations have been

1) The reduction in weight of each tile bringing overall weight down from approx. 19.50 Kilos m2 - 12.75 kilos m2(in most cases)this has resulted in being able to use a lighter grid for installation as per Rondo Design confirmation REF 4562-15-001.

2) The introduction of silicone rubber moulds this has made it possible to create very strong, clean, and sharply designed undercut ceiling tiles which are truly innovative this has only been possible with our strong commitment to R & D.

Australian Plaster Acoustics warrants all plaster products in conjunction with Rondo grid systems from the date of purchase for a period of 10 years.

This warranty does not apply to damage caused by

1) Normal wear and tear.
2) The fitting of components not supplied by Australian plaster Acoustics /Bailey Interiors or Rondo.
3) Repair ,Maintenance or service by a person not authorised by Rondo /Bailey Interiors

We Rondo and Bailey Interiors are jointly marketing these products, plaster acoustic tiles and ceiling grid as a package directly to the builder after nomination from the Department of Infrastructure.

Yours Faithfully,
Bailey Interiors Pty Ltd

Roger Bailey
Managing Director
Phone 02 91539326
Fax 0295346532
Email: roger@baileyinteriors.com.au

RONDO®
Rondo Building Services Pty Limited
ABN 69 000 289 207

NATIONAL
57–87 Lockwood Rd, Erskine Park,NSW, 2759
(PO Box 324 St Marys NSW 1790)
TEL (02) 9912 7300 FAX: (02) 9912 7310

CUSTOMER SERVICE HOTLINE
1300-36-RONDO (1300-36-7663)

www.rondo.com.au

To whom It may concern

Rondo Building Services is Australasia's largest manufacturers of roll formed lightweight steel building products for internal and external use, from steel stud and track drywall systems to building board finishing sections and from exposed and concealed ceiling systems to access panels and other ancillary products.

Rondo has been producing product to serve the building industry for over 50 years and not only has manufacturing facilities in Australia but also New Zealand, Malaysia and India as well as JV's elsewhere.

During that period Bailey Interiors manufacturers of Australian Plaster Acoustics panels has been a valued customer of Rondo.

Rondo has been pleased to partner with Bailey Interiors in the development of its innovative plaster acoustic panels by providing specification assistance in the use of the Rondo Duo^{R} Exposed Ceiling Grid System in conjunction with their panels, thereby ensuring their clients have a code compliant suspended ceiling grid system to support their plaster acoustic ceiling panels.

Steve Jupp
Product & Innovation Manager
Rondo Building Services Pty Ltd

AUSTRALIA • NEW ZEALAND • MALAYSIA • MIDDLE EAST • INDOCHINA

GYPROCK™
Everything else is just plasterboard

Bradford™
more than insulation

TO WHOM IT MAY CONCERN

Gyprock provides a comprehensive range of high performance plasterboard wall and ceiling lining solutions across all segments of the construction industry. Gyprock is also a supplier of casting plaster used in the manufacture of cast plaster products and decorative cornices. Gyprock is one of the many companies owned and operated by CSR Limited, one of Australia's oldest and most respected public companies founded in Sydney in 1855 as the Colonial Sugar Refining Company.

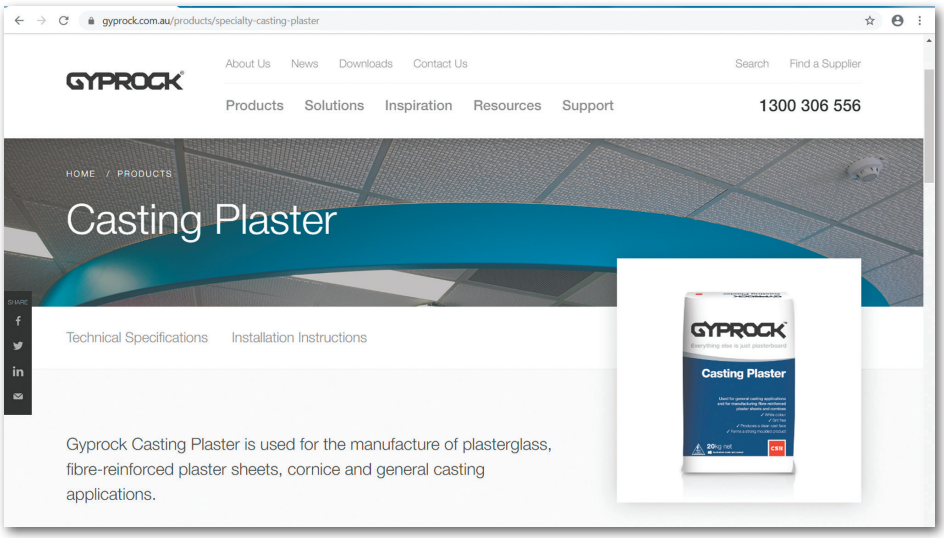
When Gyprock opened its Concord Plaster Mills in 1942, it soon became a supplier of casting plaster to Ernest Alfred Bailey who had established E. A. Bailey & Sons Pty Ltd in Boundary Road, Mortdale in 1938. Since that initial supply, Gyprock has maintained its long association with the Bailey family and continues today to supply its casting plaster to Bailey Interiors.

Over that time, Bailey Interiors has grown in significance to become the largest supplier of all types of architectural plaster products in Sydney and one of Gyprock's major customers for casting plaster. Bailey Interiors has always employed continuously innovative approaches to the manufacture of cast plaster products and demonstrates considerable expertise in moulding and casting from simple to complex shapes.

For over 80 years, CSR has manufactured glasswool insulation under the Bradford brand. Bradford is a supplier of insulation batts and acoustic fabrics used by Bailey Interiors in the manufacture of their exceptionally high performing plaster acoustic ceiling tiles namely for NRC and CAC.

CSR Building Products Limited ABN 55 008 631 356
Commercial Design Centre 7 Slough Avenue Silverwater NSW 2128
Mobile: 0419 477 359 Telephone: 02 8748 1450
Facsimile: 02 8748 1488 Email: aveling@csr.com.au

CSR



GYPROCK™
Everything else is just plasterboard

Bradford™
more than insulation

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Gyprock manufactures and supplies a comprehensive range of high performance plasterboard wall and ceiling lining solutions across all segments of the construction industry. Gyprock is one of the many companies owned and operated by CSR Limited, one of Australia's oldest and most respected public companies founded in Sydney in 1855 as the Colonial Sugar Refining Company.

Gyprock is the major supplier of casting plaster used by Australian Plaster Acoustics in the manufacture of their innovative plaster acoustic tiles. These exceptionally high performing plaster acoustic ceiling tiles are manufactured at Bailey Interiors' modern facility utilising the latest, innovative plaster tile manufacturing process. Gyprock has been a casting plaster supplier to Bailey Interiors for over 75 years.

CSR also manufactures Bradford glasswool insulation. Bradford is a supplier of insulation batts and acoustic fabrics used by Australian Plaster Acoustics. The resulting range of plaster acoustic tiles have exceptionally high performing acoustics for NRC and CAC with a modern architectural appearance.

Gyprock and Bradford are proud to be associated with Australian Plaster Acoustics and we feel confident that, based on our long association, Australian Plaster Acoustics will provide a high level of product quality, reliable service, trusted performance and industry compliance associated with their large range of plaster acoustic tiles.

Antoine Veling
NSW Commercial Segment Manager
CSR Lightweight Systems

CSR Building Products Limited ABN 55 008 631 356
Commercial Design Centre 7 Slough Avenue Silverwater NSW 2128
Mobile: 0419 477 359 Telephone: 02 8748 1450
Facsimile: 02 8748 1488 Email: aveling@csr.com.au

CSR

MATERIAL SAFETY DATA

Product Name: FBS-1 Glasswool Insulation

is classified as **Non-Hazardous** according to the criteria of the Australian Safety and Compensation Council ASCC (formerly NOHSC) Approved Criteria For Classifying Hazardous Substances. FBS-1 Glasswool Insulation is classified as **Non-Dangerous Goods** according to the Australian Code for the Transport of Dangerous Goods by Road and Rail.

- Full test results of each product for acoustic NRC and CAC can be viewed online at www.australianplasteracoustics.com.au.
- All ceiling grid and steel support systems by Rondo can be viewed from PDF files on request.
- All acoustic test are NATA approved

DISCLAIMER

Products manufactured and systems designed by Bailey Interiors are produced in accordance with the building code of Australia and New Zealand Building Code and also relevant Australian and New Zealand standards.

All acoustic testing for NRC - (Noise Reduction Coefficients) was carried out in accordance with these standards at RMIT University, Melbourne, Australia and CSIRO, Melbourne, Australia.

All sharing common ceiling testing CAC - (Ceiling Attenuation Class) was also carried out in accordance to Australian and New Zealand standards at Acoustic Laboratories Australia Pty Ltd.

All fire resistance Group 1, thermal resistance testing were also carried out to the latest Australian and New Zealand standards at AWTA a product testing in Melbourne, Australia.

All light reflective tests carried out by Light Lab International, QLD Australia in accordance with NATA accreditation.

All these products received excellent results in all instances they were tested in true laboratory situations which may differ to readings recorded on site.

Australian Plaster Acoustics will not be held responsible for any claims resulting from installation of its products not in accordance with manufacturers recommendations or relevant Australian and New Zealand standards.

Bailey Interiors has been supplying the building and architectural industry with the finest quality acoustic tiles for nearly eighty years. The Acoustic Tile Range features outstanding quality, elegant style, finish and functionality.

Green Product Sheet

Made to last a lifetime

Bailey Interiors Architectural products are made of the finest Gypsum. They have timeless features and built for longevity.

Made of natural Gypsum

Bailey Interiors Architectural products are a unique blend of at least 75% naturally occurring Gypsum.

Energy and water-efficient

Bailey Interiors Architectural products are more energy and water-efficient than alternative acrylic and resin based products. Bailey Interiors have installed a unique water recycling process whereby excess water from the production runs are recycled and used again in further production. The high Gypsum content also outperforms acrylic, which quickly dissipates water heat, resulting in reduced use of water.

Minimal manufacturing impact

Bailey Interiors Architectural products are created by a combination of machine made and hand made production methods. This combination allows for a better quality product as compared with acrylic, and composite products.

Bailey Interior's Architectural products also use significantly less energy than electrically high – heat ovens. They use a combination of natural drying and gas operated ovens.

Additionally Bailey Interiors Architectural products are hand finished by craftsmen, further reducing reliance on non renewable resources.

Minimal impact on the environment

Bailey Interiors Architectural Products are made of the finest Gypsum.

Bailey Interiors have installed two filtration units on top of the bulk silo bin. These units absorb any excess plaster dust from going in to the atmosphere whilst the plaster silo is being loaded with plaster which is pumped by compressed air from the bulk plaster truck. These filtration units allow for the air to remain clean and clear which does not impact on the environment.

Recycled Shipping

Bailey Interiors Architectural products are shipped on pallets made of reclaimed wood, with strapping made from recycled bottles.

Recycled Waste Plaster

Bailey Interiors have a special method of recycling excess casting plaster and fibre glass reinforcement. This material is transported form Bailey's current work place to be recycled as part of road base material .

Customers who choose Bailey Interiors Architectural products know they are making an environmentally good choice because they are making a purchase lasting a lifetime.

AUSTRALIAN
PLASTER ACOUSTICS
Innovative Sound Solutions

Australian Plaster Acoustics Pty Ltd
ABN 69 610 255 242

Visit our showroom at
83-85 Boundary Road
Mortdale NSW 2223
Australia

Tel: +612 9533 3909
Fax: +612 9534 6532
Eml: sales@australianplasteracoustics.com.au
Web: www.australianplasteracoustics.com.au