CANTERBURY
ACOUSTIC TESTING SERVICES

Measurements of sound absorption in a reverberation room according to AS ISO 354: 2006

Prepared for:

Robert Malcolm Ltd
10 Establishment Drive, Hornby South,
Christchurch, 8042,
New Zealand

Sample trade name:

Prepared by:

Sebastian Yeoman
Mike Latimer

Date:

Test date: 11/12/2025
Issue date: 12/01/2026

Version: V02 07/05/2025

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Version: V2 08/12/2025

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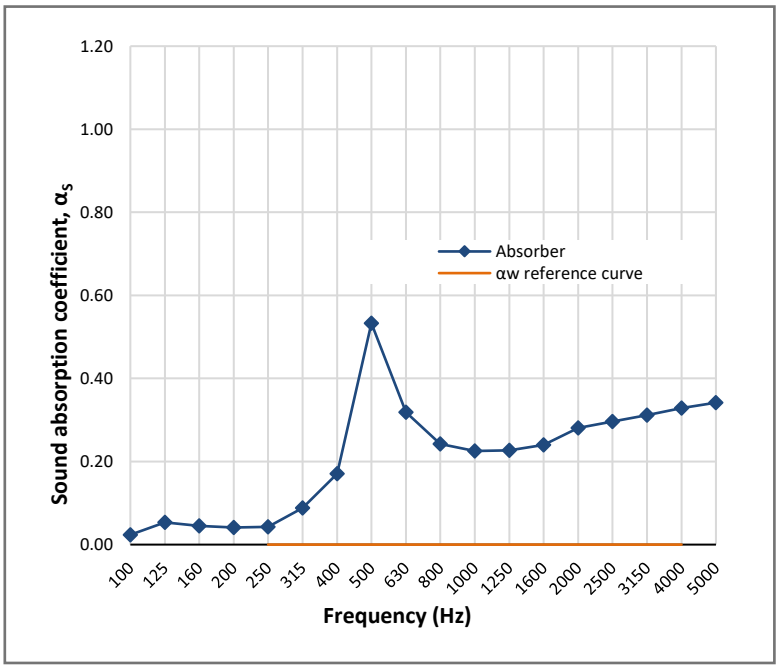
Measurement Results:

Report number: 2025-324

Client: Robert Malcolm ltd
Sample trade name: Kevlar Acoustic (130 Jet)
Test date: 11/12/2025

Sample Description:
9 mm nylon carpet tile with acoustic backing.

Frequency (Hz)	T1 – Empty Chamber (seconds)	T2 – With Sample (seconds)	α_s One-third octave
100	5.00	4.81	0.02
125	4.95	4.56	0.05
160	5.64	5.17	0.05
200	5.95	5.45	0.04
250	5.76	5.25	0.04
315	6.05	5.10	0.09
400	5.53	4.23	0.17
500	5.12	2.78	0.53
630	4.69	3.19	0.32
800	4.54	3.36	0.24
1000	4.57	3.43	0.23
1250	4.44	3.35	0.23
1600	4.20	3.17	0.24
2000	3.77	2.82	0.28
2500	3.16	2.44	0.30
3150	2.90	2.26	0.31
4000	2.58	2.03	0.33
5000	2.29	1.84	0.34



Mounting type:	A-mount	**Sample size:**	500 x 500 x 9 mm	**Air Temperature:**	22.8 °C
Unit sample mass:	0.9 kg	**Sample area S:**	10.5 m^2	**Relative Humidity (R/H):**	61.9 %
Sample surface density	3.6 kg/m^2	**Number of elements:**	42	**Barometric Pressure:**	101.5 kPa

Comments:

- The test results presented refer only to the test specimens and prevailing conditions on the day of the measurements and may or may not be representative of a different batch of material.
- The Noise Reduction Coefficient (NRC) has been calculated in general accordance with ASTM C423 – 99. Using measurement results obtained from AS ISO 354 – 2006, it has been included due to its wide use when comparing the acoustic properties of sound absorbent materials.
- Evaluation is based on laboratory measurement results obtained by an engineering method.

Ratings according to ISO 11654: 1997

Practical sound absorption coefficient:

Frequency (Hz)	α_p
125	0.05
250	0.05
500	0.35
1000	0.25
2000	0.25
4000	0.35

Weighted sound absorption coefficient:

α_w	0.25
Shape indication:	M
Absorber classification:	E

It is strongly recommended to use this single-number rating in combination with the complete sound absorption coefficient curve that can be obtained on request.

Single number rating in general accordance with ASTM – 99, ASTM C423 - 17

Noise Reduction Coefficient (NRC): **0.25**

Sound Absorption Average (SAA): **0.30**

Created by:
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Technical Lead
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Date: 12/01/2026

Checked by:
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Acoustic Lab Lead
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Appendix 1: Methodology

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Facility:	• The reverberation room at the Canterbury Acoustic Testing Services Lab facility, 180 Hazeldean Road, Christchurch, New Zealand, is a cuboid shaped chamber. • Constructed in accordance with *AS ISO 354 - 2006. Subsections 6.1.1 Volume of reverberation room, and 6.1.2 Shape of reverberation room*, of the following dimensions: 7.7 m x 6.1 m x 4.7 m high. • The room has a cubic volume of ~220 m^3 and internal surface area of ~223.66 m^2, as shown in *Appendix 2,* Figure 1.
Diffuser treatment:	• The chamber has six stationary hanging diffusers, made from 12 mm painted plywood and MDF, in the following sizes, 3 at 1.2 x 1.4 m, 3 at 1.2 x 1 m, 2 at 1.2 x 1.2 m. • The diffusers are suspended in a random orientation to create a diffuse sound field in accordance with *AS ISO 354 - 2006*. • Two adjacent corners of the chamber have melamine covered MDF volume diffusers, in the form of an acute Isosceles triangle, 0.75 m at the base and 1.1 m high.
Sample mounting:	• Type A mounting positions the specimen directly onto the reverberation room floor, without any supporting frame or air space behind it. This mounting configuration represents installation conditions where the material is applied flush to a solid substrate • In accordance with Annex B of *AS ISO 354 - 2006*, the perimeter of the test specimen is secured using duct tape to ensure the products remains flush against the floor and to prevent any air gap forming that could alter its acoustic behaviour.
Procedure:	• The tests were carried out following the interrupted noise technique outlined *in AS ISO 354: 2006 Acoustics -- Measurement of sound absorption in a reverberation room.*
Generation of sound field:	• The test signal used was random pink noise, generated by a SINUS multi-channel analyser system, using PC based acquisition software. • The signal was fed through an amplifier to two omnidirectional speakers placed in opposite corners of the reverberation room, to excite the sound field in the room.
Receipt of signal:	• The sound field was measured using six microphone positions connected to the SINUS multi-channel analyser. • The reverberation times were determined for the empty room and for the room containing the test specimen. • This was accomplished through the analysis of nine sound field decays for each of six microphone positions, across two loudspeaker positions, generating a total of 36 decay measurements per one-third octave frequency band. • The 1/3 octave frequency band decay data was exported from the acquisition program. • The measurement data was analysed to determine the absorption coefficient of the test specimen.
Instrumentation:	

Description	Manufacture	Model	Calibration	Serial number
Analyser	Sinus	Apollo Box 2 and 4 channel	26/03/2025	7591, 7569
Calibrator	Larson Davis	CAL200	26/03/2025	9063
Noise source	Norsonic Bruel& Kjaer	NOR276 OmniPower 4296		2766177 2071500
Amplifier	BETA 3	UA330		
Microphones	Microtech Gefell	MK255	26/03/2025	10007, 10014
	G.R.A.S	46AE	26/03/2025	196169, 184222, 183512, 183079

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Appendix 2: Facilities

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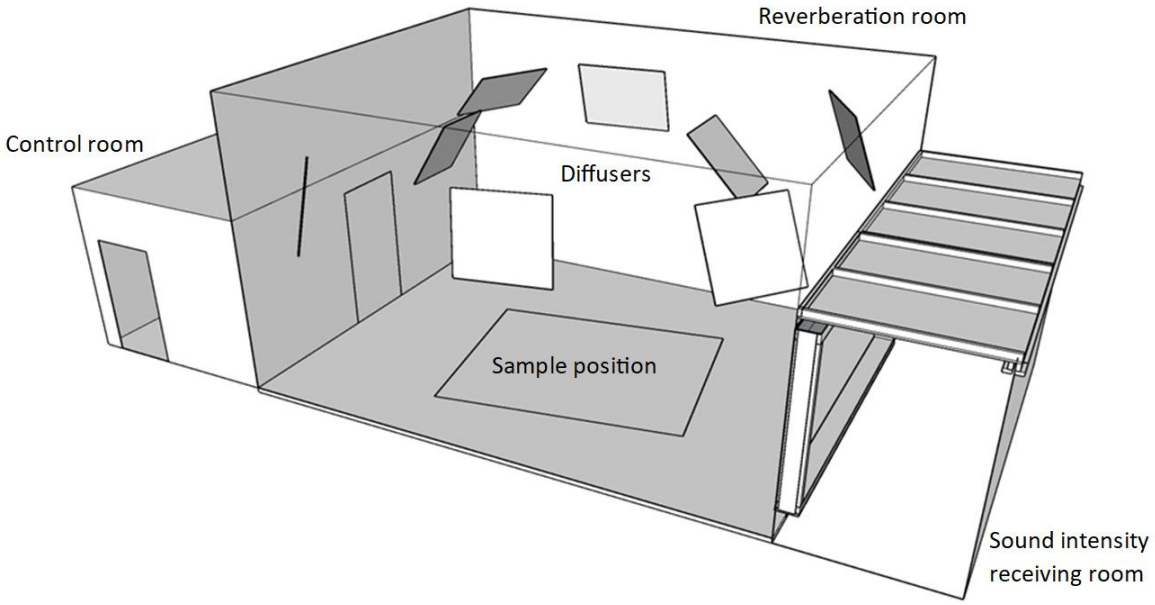

Figure 1 - Reverberation room general layout

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Appendix 3: Sample Mounting

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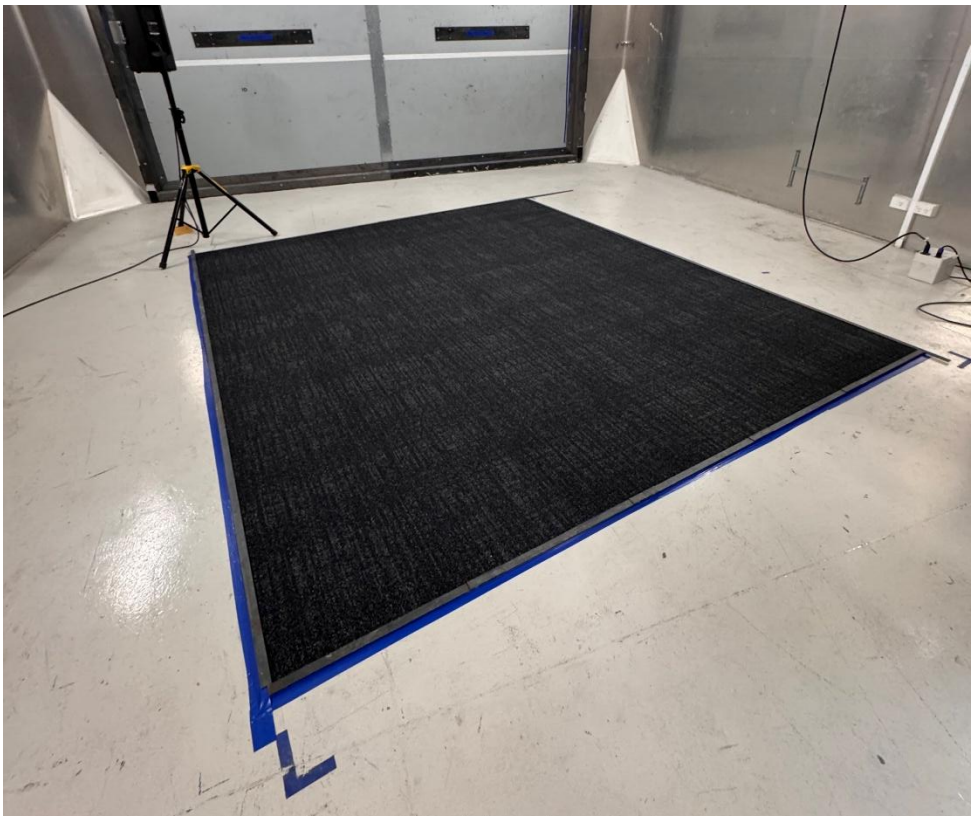

Figure 2 - Robert Malcolm Kevlar Acoustic tile on reverb room floor