0444

Technical Report

24870-SRL-RP-XT-002-P1

Project

The Laboratory Measurement of The Random Incidence Sound Absorption Coefficient of Wall Panels

Prepared for

The Acoustics Company

By

Kieron Farrow

Published

14 December 2021

Template Ref: Lab Edition 5 – Mar 2021

0444

Quality Assurance	
Project Title	The Laboratory Measurement of The Random Incidence Sound Absorption Coefficient of Wall Panels
Document Title	Laboratory Test Report
Client	The Acoustics Company
Client Address	Unit D, Hailsfield 10 Telford Shropshire TF7 4QP
Author	Kieron Farrow
Checker	Allen Smalls
Report Number	24870-SRL-RP-XT-002-P1

Report Version History

Version	Date	Comments
P1 002	14/12/2021	Original Report

Kieron Farrow
Tester
For and on behalf of
SRL Technical Services Limited
Tel: 01787 247595
Email: kfarrow@srltsl.com

Allen Smalls
Quality Manager

Contents

1.0 Description of Test

Tests have been done in SRL's Laboratory at Holbrook House, Sudbury, Suffolk, to determine the random incidence sound absorption coefficient of various ceiling tiles in accordance with BS EN ISO 354:2003 and the single number rating in accordance with BS EN ISO 11654:1997.

The results are given in 1/3rd octave bands over the frequency range 50Hz to 10kHz, which is beyond that required by the test standard. Measurements outside the standard frequency range are not UKAS accredited.

1.1 Description of Sample

Tests were performed on various wall panels with nominal dimensions of 2400x1200mm and 2800x1200mm. See Data Sheets 1 to 17 and section 2.0 for more details.

Sampling plan:	Taken from top of pile
Sample condition:	New
Details supplied by:	Test Sponsor
Sample installed by:	Test Sponsor

1.2 Sample Delivery Date

25 November 2021

1.3 Test Procedures

The sample was mounted/located and tested in accordance with the relevant standard. The details of measurements are given in Appendix A. The method and procedure are described in Appendix B, the measurement uncertainty is given in Appendix C and the mounting methods are described in Appendix D.

2.0 Results

The results of the measurements and subsequent analysis are given in Data Sheets 1 to 17 and summarised below.

Results relate only to the items as received and tested.

SRL Test No.	Test Description	Mounting method	α_w
1		~~A~~	~~0.55 (H)~~
2		~~A~~	~~0.90~~
3		~~A~~	~~1.00~~
4	Alpha Acoustic Panel 24mm Direct Fix 2800x1200x24mm	A	0.50 (MH)
5	Alpha Acoustic Panel 24mm 2800x1200x24mm	E-49	0.70 (MH)
6	Alpha Acoustic Panel 24mm 2800x1200x24mm	E-74	0.80 (H)
7	Alpha Acoustic Panel 24mm 2800x1200x24mm	E-99	0.90
8	Alpha Acoustic Panel 12mm 2800x1200x12mm	E-87	0.75 (MH)
9	Alpha Acoustic Panel 12mm 2800x1200x12mm	E-62	0.60 (MH)
10	Alpha Acoustic Panel 12mm 2800x1200x12mm	E-37	0.50 (MH)
11	Alpha Acoustic Panel 12mm Direct Fix 2800x1200x12mm	A	0.35 (H)
12	Alpha Acoustic Panel 12mm 2800x1200x12mm	E-312	0.95
13	Alpha Acoustic Panel 24mm 2800x1200x24mm	E-324	1.00
14	Alpha Acoustic Panel 24mm 2800x1200x24mm	E-224	1.00
15	Alpha Acoustic Panel 12mm 2800x1200x12mm	E-212	1.00
16	Alpha Acoustic Panel 24mm 2800x1200x24mm	E-124	0.95
17	Alpha Acoustic Panel 12mm 2800x1200x12mm	E-112	0.75 (MH)

12mm DIRECT FIX

Data Sheet 11

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

Test Number:	11	**Test Room:**	**Empty**	**With Sample**
Client:	The Acoustics Company	**Air Temperature:**	16.1 °C	15.9 °C
Test Date:	26/11/2021	**Air Humidity:**	51 % RH	49 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	984 mbar	981 mbar
Mounting Method:	A	**Sample Area:**	10.08 m²	
Sample Description:	Alpha Acoustic Panel 12mm Direct Fix 2800x1200x12mm			

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.85*	*4.80*	*0.01*	
*63**	*4.47*	*4.48*	*0.00*	*n/a*
*80**	*7.13*	*7.09*	*0.00*	
100	*7.26*	*7.00*	*0.03*	
125	*6.17*	*6.07*	*0.01*	*0.00*
160	*6.39*	*6.17*	*0.03*	
200	*6.72*	*6.06*	*0.08*	
250	*6.66*	*6.10*	*0.07*	*0.10*
315	*6.53*	*5.48*	*0.14*	
400	*6.32*	*5.04*	*0.19*	
500	*5.46*	*4.20*	*0.27*	*0.30*
630	*5.00*	*3.54*	*0.40*	
800	*5.01*	*3.31*	*0.50*	
1000	*5.45*	*3.30*	*0.58*	*0.55*
1250	*5.29*	*3.18*	*0.60*	
1600	*4.93*	*2.88*	*0.70*	
2000	*4.60*	*2.60*	*0.80*	*0.80*
2500	*4.04*	*2.32*	*0.87*	
3150	*3.31*	*1.94*	*1.00*	
4000	*2.60*	*1.65*	*1.03*	*1.00*
5000	*2.07*	*1.38*	*1.11*	
*6300**	*1.43*	*1.06*	*1.06*	
*8000**	*1.16*	*0.90*	*1.08*	n/a
*10000**	0.82	0.68	1.02	

α_w 0.35(H)

Class D

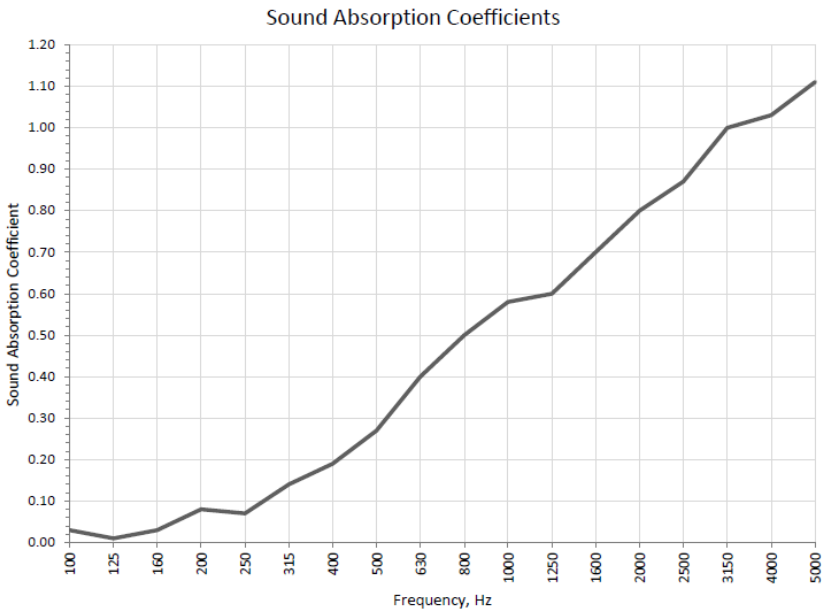
Calculated to BS EN ISO 11654:1997

NRC 0.45

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*

v1



0444

12mm + 25mm Air Gap

Data Sheet 10

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

Test Number:	10	**Test Room:**	**Empty**	**With Sample**
Client:	The Acoustics Company	**Air Temperature:**	16.1 °C	15.9 °C
Test Date:	26/11/2021	**Air Humidity:**	51 % RH	49 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	984 mbar	980 mbar
Mounting Method:	E-37	**Sample Area:**	10.08 m²	
Sample Description:	Alpha Acoustic Panel 12mm 2800x1200x12mm			

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.85*	*4.67*	*0.04*	*n/a*
*63**	*4.47*	*4.29*	*0.05*	
*80**	*7.13*	*6.37*	*0.08*	
100	7.26	6.77	0.05	0.10
125	6.17	5.65	0.07	
160	6.39	5.52	0.12	
200	6.72	5.56	0.15	0.20
250	6.66	5.34	0.18	
315	6.53	4.56	0.32	
400	6.32	4.06	0.43	0.55
500	5.46	3.37	0.55	
630	5.00	2.96	0.67	
800	5.01	2.70	0.83	0.90
1000	5.45	2.75	0.87	
1250	5.29	2.58	0.96	
1600	4.93	2.38	1.05	1.00
2000	4.60	2.27	1.07	
2500	4.04	2.10	1.09	
3150	3.31	1.90	1.06	1.00
4000	2.60	1.67	1.00	
5000	2.07	1.42	1.01	
*6300**	*1.43*	*1.08*	*1.01*	n/a
*8000**	*1.16*	*0.91*	*0.99*	
*10000**	0.82	0.68	1.08	

α_w 0.50(MH)

Class D

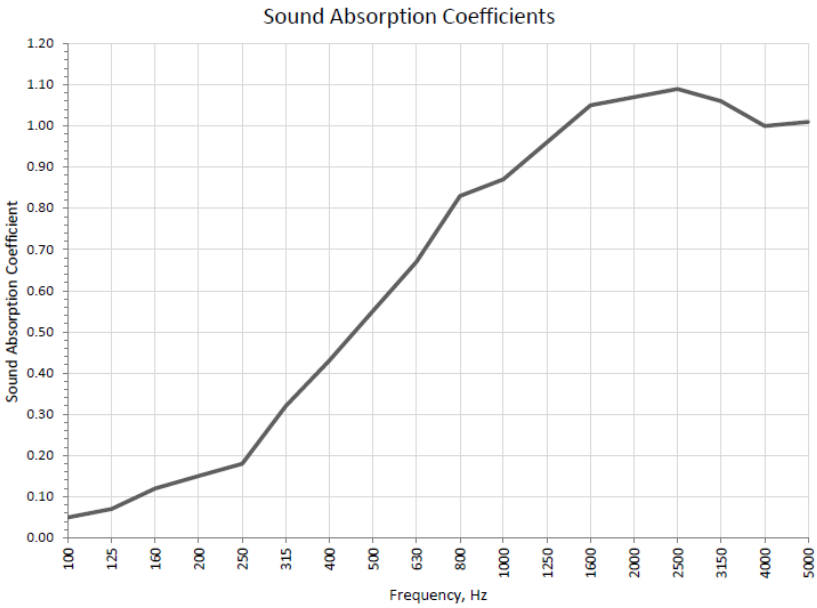
Calculated to BS EN ISO 11654:1997

NRC 0.65

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*

v1



12mm + 50mm Air Gap

Data Sheet 9

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

Test Number:	9	**Test Room:**	**Empty**	**With Sample**
Client:	The Acoustics Company	**Air Temperature:**	16.1 °C	15.8 °C
Test Date:	26/11/2021	**Air Humidity:**	51 % RH	49 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	984 mbar	980 mbar
Mounting Method:	E-62	**Sample Area:**	10.08 m²	

Sample Description: Alpha Acoustic Panel 12mm 2800x1200x12mm

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.85*	*4.72*	*0.03*	*n/a*
*63**	*4.47*	*4.18*	*0.08*	
*80**	*7.13*	*6.31*	*0.09*	
100	*7.26*	*6.29*	*0.10*	*0.10*
125	*6.17*	*5.57*	*0.09*	
160	*6.39*	*5.30*	*0.15*	
200	*6.72*	*5.24*	*0.20*	*0.30*
250	*6.66*	*4.89*	*0.26*	
315	*6.53*	*4.17*	*0.42*	
400	*6.32*	*3.56*	*0.60*	*0.70*
500	*5.46*	*3.04*	*0.70*	
630	*5.00*	*2.66*	*0.85*	
800	*5.01*	*2.41*	*1.04*	*1.00*
1000	*5.45*	*2.50*	*1.04*	
1250	*5.29*	*2.44*	*1.07*	
1600	*4.93*	*2.33*	*1.09*	*1.00*
2000	*4.60*	*2.33*	*1.02*	
2500	*4.04*	*2.19*	*0.99*	
3150	*3.31*	*1.96*	*0.98*	*1.00*
4000	*2.60*	*1.66*	*1.02*	
5000	*2.07*	*1.39*	*1.08*	
*6300**	*1.43*	*1.07*	*1.01*	*n/a*
*8000**	*1.16*	*0.90*	*1.05*	
*10000**	0.82	0.68	1.02	

α_w 0.60(MH)

Class C

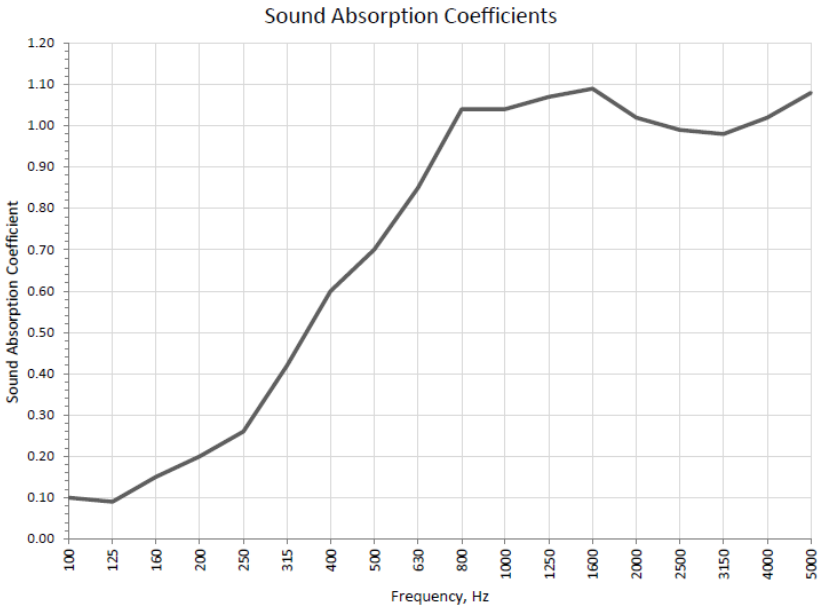
Calculated to BS EN ISO 11654:1997

NRC 0.75

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*

v1



0444

12mm + 75mm Air Gap

Data Sheet 8

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

Test Number:	8	**Test Room:**	**Empty**	**With Sample**
Client:	The Acoustics Company	**Air Temperature:**	16.1 °C	15.8 °C
Test Date:	26/11/2021	**Air Humidity:**	51 % RH	49 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	984 mbar	981 mbar
Mounting Method:	E-87	**Sample Area:**	10.08 m²	
Sample Description:	Alpha Acoustic Panel 12mm 2800x1200x12mm			

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.85*	*4.69*	*0.03*	
*63**	*4.47*	*4.26*	*0.05*	*n/a*
*80**	*7.13*	*5.93*	*0.14*	
100	*7.26*	*6.22*	*0.11*	
125	*6.17*	*5.32*	*0.13*	*0.15*
160	*6.39*	*4.96*	*0.22*	
200	*6.72*	*4.64*	*0.32*	
250	*6.66*	*4.24*	*0.41*	*0.45*
315	*6.53*	*3.69*	*0.57*	
400	*6.32*	*3.23*	*0.73*	
500	*5.46*	*2.77*	*0.86*	*0.85*
630	*5.00*	*2.43*	*1.03*	
800	*5.01*	*2.30*	*1.14*	
1000	*5.45*	*2.39*	*1.13*	*1.00*
1250	*5.29*	*2.38*	*1.12*	
1600	*4.93*	*2.36*	*1.06*	
2000	*4.60*	*2.42*	*0.93*	*1.00*
2500	*4.04*	*2.21*	*0.97*	
3150	*3.31*	*1.86*	*1.11*	
4000	*2.60*	*1.63*	*1.06*	*1.00*
5000	*2.07*	*1.39*	*1.08*	
*6300**	*1.43*	*1.08*	*1.00*	
*8000**	*1.16*	*0.91*	*1.01*	n/a
*10000**	0.82	0.67	1.08	

α_w 0.75(MH)

Class C

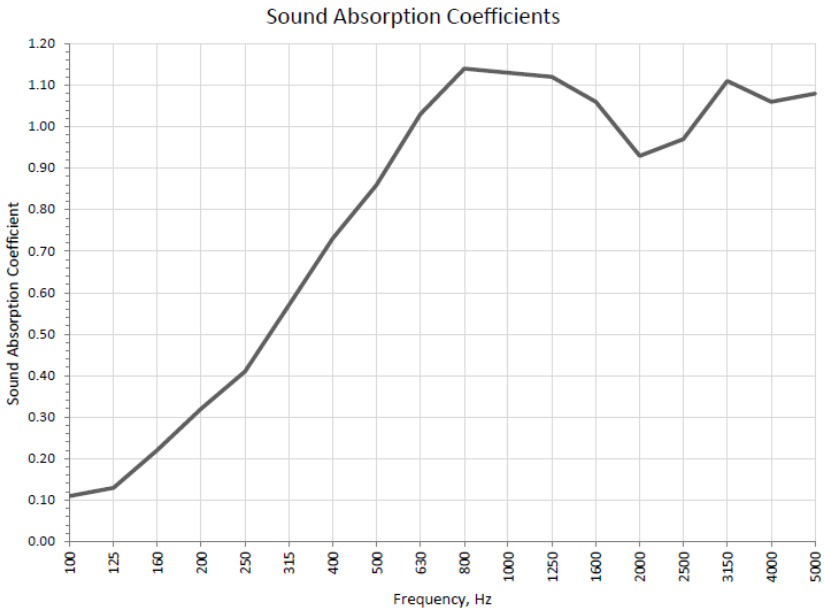
Calculated to BS EN ISO 11654:1997

NRC 0.85

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*

v1



12mm + 100mm Air Gap

Data Sheet 17

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

Test Number:	17	**Test Room:**	**Empty**	**With Sample**
Client:	The Acoustics Company	**Air Temperature:**	15.9 °C	15.9 °C
Test Date:	26/11/2021	**Air Humidity:**	49 % RH	48 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	980 mbar	979 mbar
Mounting Method:	E-112	**Sample Area:**	10.08 m²	
Sample Description:	Alpha Acoustic Panel 12mm 2800x1200x12mm			

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.78*	*4.60*	*0.04*	*n/a*
*63**	*4.51*	*4.16*	*0.09*	
*80**	*7.12*	*6.29*	*0.09*	
100	*7.31*	*6.38*	*0.10*	*0.15*
125	*6.38*	*5.29*	*0.16*	
160	*6.26*	*4.86*	*0.22*	
200	*6.54*	*4.61*	*0.31*	*0.45*
250	*6.72*	*4.22*	*0.43*	
315	*6.67*	*3.73*	*0.57*	
400	*6.44*	*3.21*	*0.76*	*0.90*
500	*5.43*	*2.69*	*0.90*	
630	*4.92*	*2.45*	*0.99*	
800	*4.89*	*2.32*	*1.10*	*1.00*
1000	*5.40*	*2.44*	*1.08*	
1250	*5.29*	*2.49*	*1.03*	
1600	*4.89*	*2.53*	*0.92*	*0.95*
2000	*4.50*	*2.41*	*0.93*	
2500	*3.98*	*2.14*	*1.04*	
3150	*3.24*	*1.86*	*1.09*	*1.00*
4000	*2.54*	*1.63*	*1.05*	
5000	*2.00*	*1.37*	*1.06*	
*6300**	*1.37*	*1.03*	*1.12*	n/a
*8000**	*1.12*	*0.88*	*1.12*	
*10000**	0.79	0.66	1.06	

α_w 0.75(MH)

Class C

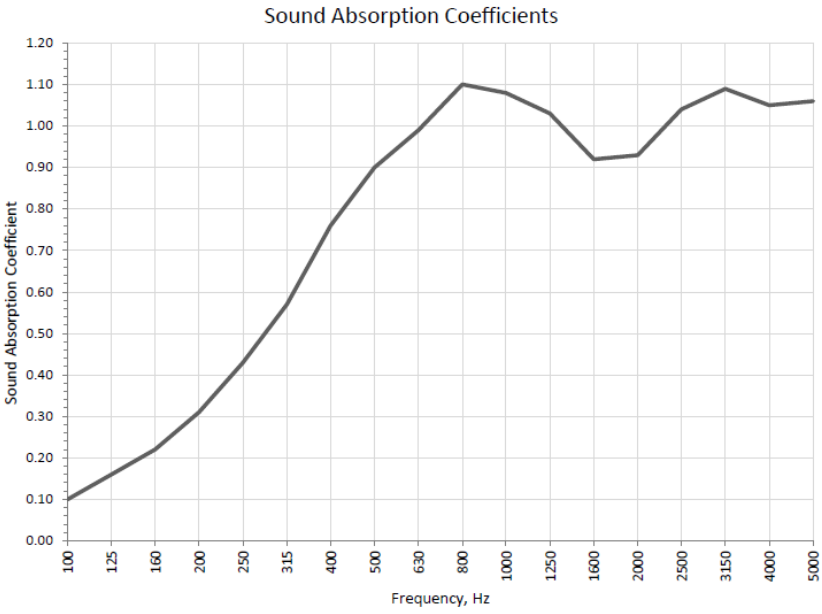
Calculated to BS EN ISO 11654:1997

NRC 0.85

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*

v1



12mm + 200mm Air Gap

Data Sheet 15

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

Test Number:	15	**Test Room:**	**Empty**	**With Sample**
Client:	The Acoustics Company	**Air Temperature:**	16.1 °C	16 °C
Test Date:	26/11/2021	**Air Humidity:**	51 % RH	48 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	984 mbar	980 mbar
Mounting Method:	E-212	**Sample Area:**	10.08 m²	

Sample Description: Alpha Acoustic Panel 12mm 2800x1200x12mm

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.85*	*4.61*	*0.05*	
*63**	*4.47*	*3.95*	*0.14*	*n/a*
*80**	*7.13*	*5.03*	*0.28*	
100	*7.26*	*4.94*	*0.31*	
125	*6.17*	*4.03*	*0.41*	*0.45*
160	*6.39*	*3.67*	*0.56*	
200	*6.72*	*3.27*	*0.76*	
250	*6.66*	*3.03*	*0.87*	*0.85*
315	*6.53*	*2.88*	*0.94*	
400	*6.32*	*2.70*	*1.03*	
500	*5.46*	*2.52*	*1.04*	*1.00*
630	*5.00*	*2.44*	*1.01*	
800	*5.01*	*2.63*	*0.88*	
1000	*5.45*	*2.86*	*0.80*	*0.90*
1250	*5.29*	*2.59*	*0.95*	
1600	*4.93*	*2.40*	*1.02*	
2000	*4.60*	*2.29*	*1.05*	*1.00*
2500	*4.04*	*2.10*	*1.08*	
3150	*3.31*	*1.89*	*1.06*	
4000	*2.60*	*1.63*	*1.05*	*1.00*
5000	*2.07*	*1.38*	*1.08*	
*6300**	*1.43*	*1.06*	*1.06*	
*8000**	*1.16*	*0.89*	*1.05*	n/a
*10000**	0.82	0.67	1.11	

α_w 1.00

Class A

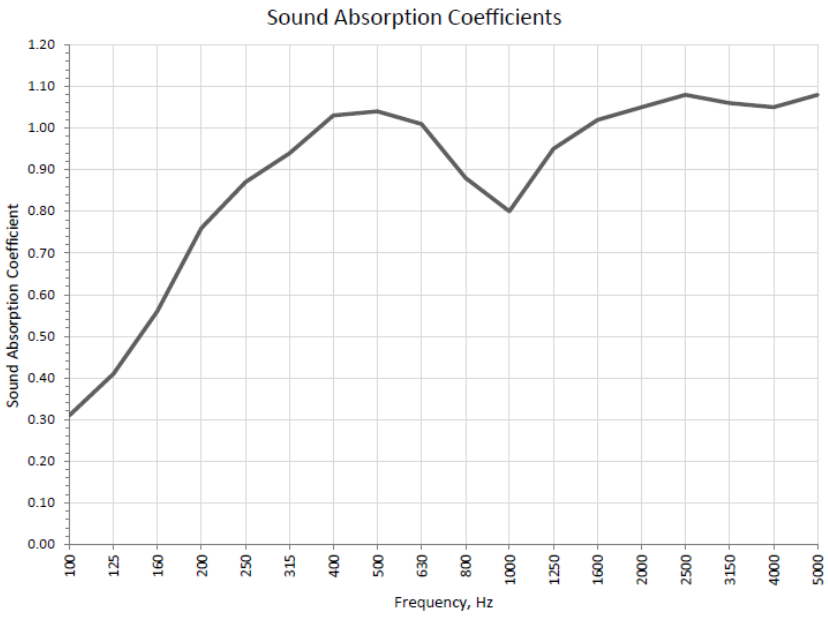
Calculated to BS EN ISO 11654:1997

NRC 0.95

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*

v1



12mm + 300mm Air Gap

Data Sheet 12

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

Test Number:	12	**Test Room:**	**Empty**	**With Sample**
Client:	The Acoustics Company	**Air Temperature:**	16.1 °C	16.2 °C
Test Date:	26/11/2021	**Air Humidity:**	51 % RH	49 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	984 mbar	979 mbar
Mounting Method:	E-312	**Sample Area:**	10.08 m²	
Sample Description:	Alpha Acoustic Panel 12mm 2800x1200x12mm			

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.85*	*4.41*	*0.10*	*n/a*
*63**	*4.47*	*3.99*	*0.13*	
*80**	*7.13*	*4.74*	*0.34*	
100	*7.26*	*4.42*	*0.43*	*0.60*
125	*6.17*	*3.41*	*0.64*	
160	*6.39*	*3.27*	*0.72*	
200	*6.72*	*3.11*	*0.83*	*0.95*
250	*6.66*	*2.85*	*0.97*	
315	*6.53*	*2.77*	*1.01*	
400	*6.32*	*2.68*	*1.04*	*0.90*
500	*5.46*	*2.72*	*0.89*	
630	*5.00*	*2.76*	*0.79*	
800	*5.01*	*2.57*	*0.91*	*0.95*
1000	*5.45*	*2.57*	*0.99*	
1250	*5.29*	*2.56*	*0.97*	
1600	*4.93*	*2.35*	*1.07*	*1.00*
2000	*4.60*	*2.22*	*1.12*	
2500	*4.04*	*2.09*	*1.10*	
3150	*3.31*	*1.86*	*1.11*	*1.00*
4000	*2.60*	*1.59*	*1.15*	
5000	*2.07*	*1.37*	*1.16*	
*6300**	*1.43*	*1.06*	*1.09*	*n/a*
*8000**	*1.16*	*0.90*	*1.11*	
*10000**	0.82	0.68	1.1	

α_w 0.95

Class A

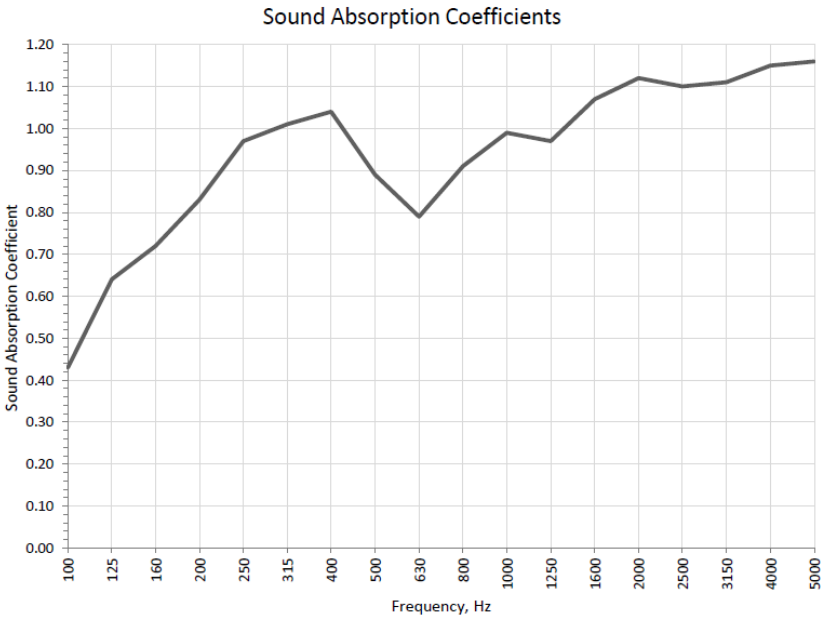
Calculated to BS EN ISO 11654:1997

NRC 1.00

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*

v1



24mm ALPHA - Direct Fix

Data Sheet 4

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

Test Number:	4	**Test Room:**	**Empty**	**With Sample**
Client:	The Acoustics Company	**Air Temperature:**	16.1 °C	15.6 °C
Test Date:	26/11/2021	**Air Humidity:**	51 % RH	49 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	984 mbar	983 mbar
Mounting Method:	A	**Sample Area:**	10.08 m²	

Sample Description: Alpha Acoustic Panel 24mm Direct Fix 2800x1200x24mm

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.85*	*4.78*	*0.02*	
*63**	*4.47*	*4.39*	*0.02*	*n/a*
*80**	*7.13*	*6.29*	*0.09*	
100	*7.26*	*7.08*	*0.02*	
125	*6.17*	*5.94*	*0.03*	*0.05*
160	*6.39*	*5.78*	*0.08*	
200	*6.72*	*5.57*	*0.15*	
250	*6.66*	*5.38*	*0.17*	*0.20*
315	*6.53*	*4.61*	*0.31*	
400	*6.32*	*4.01*	*0.44*	
500	*5.46*	*3.33*	*0.57*	*0.60*
630	*5.00*	*2.77*	*0.78*	
800	*5.01*	*2.75*	*0.80*	
1000	*5.45*	*2.79*	*0.84*	*0.85*
1250	*5.29*	*2.67*	*0.90*	
1600	*4.93*	*2.47*	*0.97*	
2000	*4.60*	*2.29*	*1.05*	*1.00*
2500	*4.04*	*2.12*	*1.06*	
3150	*3.31*	*1.84*	*1.14*	
4000	*2.60*	*1.59*	*1.13*	*1.00*
5000	*2.07*	*1.36*	*1.15*	
*6300**	*1.43*	*1.04*	*1.14*	
*8000**	*1.16*	*0.88*	*1.11*	n/a
*10000**	0.82	0.66	1.22	

α_w 0.50(MH)

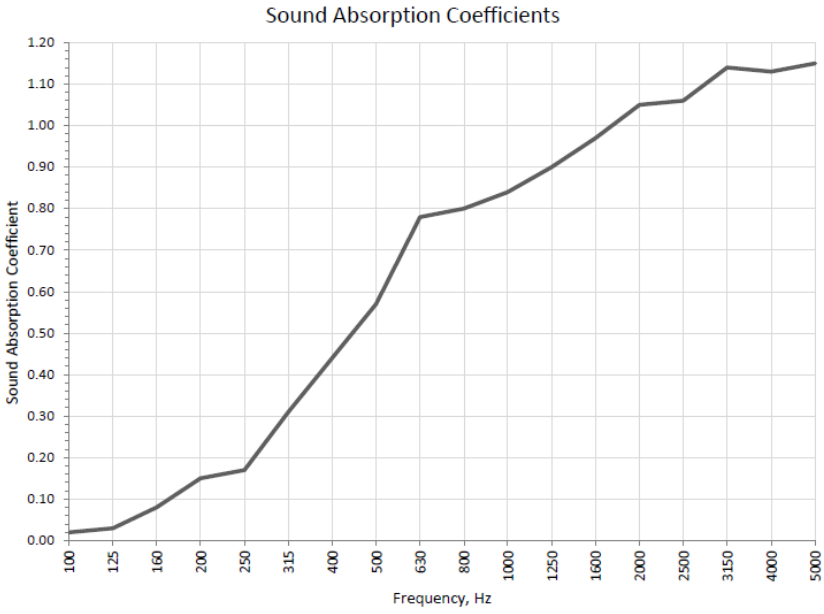
Class D

Calculated to BS EN ISO 11654:1997

NRC 0.65

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*



v1

24mm + 25mm Air Gap

Data Sheet 5

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

			Empty	With Sample
Test Number:	5	**Test Room:**		
Client:	The Acoustics Company	**Air Temperature:**	16.1 °C	15.9 °C
Test Date:	26/11/2021	**Air Humidity:**	51 % RH	49 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	984 mbar	981 mbar
Mounting Method:	E-49	**Sample Area:**	10.08 m²	
Sample Description:	Alpha Acoustic Panel 24mm 2800x1200x24mm			

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.85*	*4.73*	*0.03*	*n/a*
*63**	*4.47*	*4.19*	*0.07*	
*80**	*7.13*	*6.41*	*0.08*	
100	*7.26*	*6.22*	*0.11*	*0.15*
125	*6.17*	*5.39*	*0.11*	
160	*6.39*	*5.13*	*0.19*	
200	*6.72*	*4.70*	*0.31*	*0.40*
250	*6.66*	*4.50*	*0.35*	
315	*6.53*	*3.82*	*0.53*	
400	*6.32*	*3.26*	*0.72*	*0.85*
500	*5.46*	*2.67*	*0.92*	
630	*5.00*	*2.49*	*0.97*	
800	*5.01*	*2.45*	*1.01*	*1.00*
1000	*5.45*	*2.47*	*1.07*	
1250	*5.29*	*2.46*	*1.05*	
1600	*4.93*	*2.33*	*1.09*	*1.00*
2000	*4.60*	*2.28*	*1.06*	
2500	*4.04*	*2.11*	*1.08*	
3150	*3.31*	*1.87*	*1.10*	*1.00*
4000	*2.60*	*1.61*	*1.10*	
5000	*2.07*	*1.36*	*1.15*	
*6300**	*1.43*	*1.05*	*1.13*	n/a
*8000**	*1.16*	*0.90*	*1.05*	
*10000**	0.82	0.67	1.12	

α_w 0.70(MH)

Class C

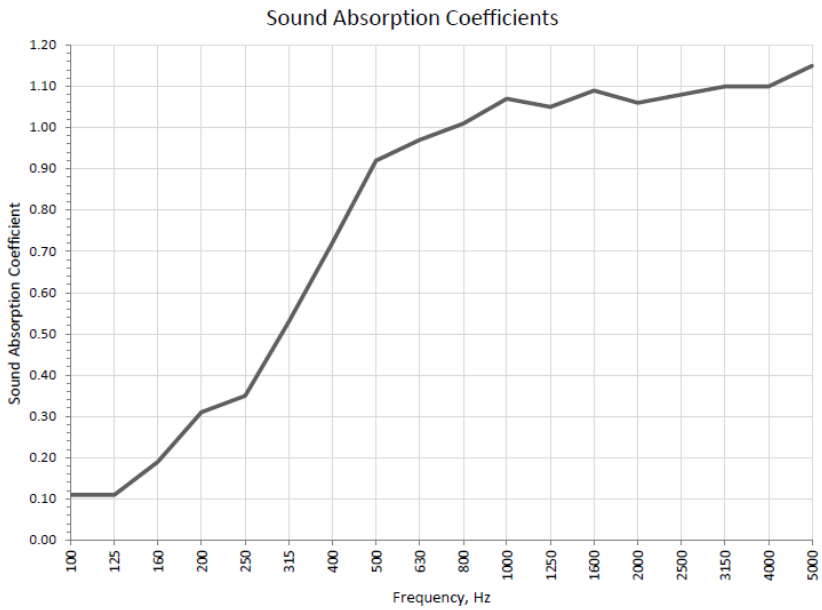
Calculated to BS EN ISO 11654:1997

NRC 0.85

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*

v1



24mm + 50mm Air Gap

Data Sheet 6

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

Test Number:	6	**Test Room:**	**Empty**	**With Sample**
Client:	The Acoustics Company	**Air Temperature:**	16.1 °C	15.8 °C
Test Date:	26/11/2021	**Air Humidity:**	51 % RH	49 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	984 mbar	981 mbar
Mounting Method:	E-74	**Sample Area:**	10.08 m²	
Sample Description:	Alpha Acoustic Panel 24mm 2800x1200x24mm			

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.85*	*4.75*	*0.02*	*n/a*
*63**	*4.47*	*4.22*	*0.06*	
*80**	*7.13*	*6.14*	*0.11*	
100	*7.26*	*5.83*	*0.16*	*0.20*
125	*6.17*	*5.32*	*0.13*	
160	*6.39*	*4.76*	*0.26*	
200	*6.72*	*4.42*	*0.38*	*0.50*
250	*6.66*	*3.98*	*0.49*	
315	*6.53*	*3.43*	*0.67*	
400	*6.32*	*2.95*	*0.88*	*1.00*
500	*5.46*	*2.51*	*1.04*	
630	*5.00*	*2.33*	*1.11*	
800	*5.01*	*2.27*	*1.17*	*1.00*
1000	*5.45*	*2.39*	*1.14*	
1250	*5.29*	*2.42*	*1.09*	
1600	*4.93*	*2.34*	*1.08*	*1.00*
2000	*4.60*	*2.28*	*1.06*	
2500	*4.04*	*2.10*	*1.08*	
3150	*3.31*	*1.85*	*1.12*	*1.00*
4000	*2.60*	*1.60*	*1.11*	
5000	*2.07*	*1.38*	*1.10*	
*6300**	*1.43*	*1.06*	*1.07*	n/a
*8000**	*1.16*	*0.89*	*1.11*	
*10000**	0.82	0.68	1.04	

α_w 0.80(H)

Class B

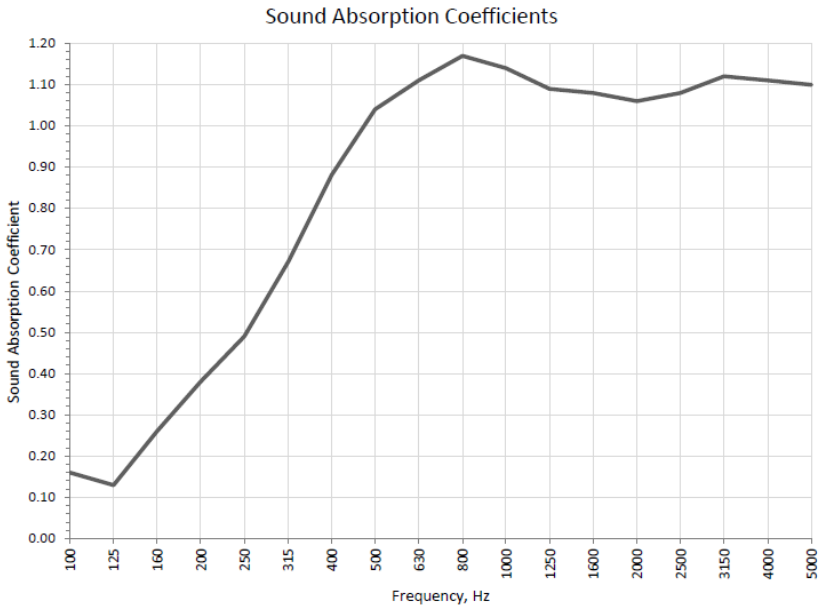
Calculated to BS EN ISO 11654:1997

NRC 0.95

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*

v1



24mm + 75mm Air Gap

Data Sheet 7

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

Test Number:	7	**Test Room:**	**Empty**	**With Sample**
Client:	The Acoustics Company	**Air Temperature:**	16.1 °C	15.9 °C
Test Date:	26/11/2021	**Air Humidity:**	51 % RH	49 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	984 mbar	981 mbar
Mounting Method:	E-99	**Sample Area:**	10.08 m²	
Sample Description:	Alpha Acoustic Panel 24mm 2800x1200x24mm			

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.85*	*4.64*	*0.05*	
*63**	*4.47*	*4.23*	*0.06*	*n/a*
*80**	*7.13*	*5.98*	*0.13*	
100	*7.26*	*5.57*	*0.20*	
125	*6.17*	*4.86*	*0.21*	*0.25*
160	*6.39*	*4.56*	*0.30*	
200	*6.72*	*4.11*	*0.46*	
250	*6.66*	*3.61*	*0.61*	*0.60*
315	*6.53*	*3.17*	*0.78*	
400	*6.32*	*2.77*	*0.98*	
500	*5.46*	*2.46*	*1.08*	*1.00*
630	*5.00*	*2.29*	*1.15*	
800	*5.01*	*2.24*	*1.20*	
1000	*5.45*	*2.31*	*1.21*	*1.00*
1250	*5.29*	*2.41*	*1.09*	
1600	*4.93*	*2.36*	*1.07*	
2000	*4.60*	*2.28*	*1.06*	*1.00*
2500	*4.04*	*2.08*	*1.11*	
3150	*3.31*	*1.83*	*1.16*	
4000	*2.60*	*1.60*	*1.11*	*1.00*
5000	*2.07*	*1.36*	*1.16*	
*6300**	*1.43*	*1.05*	*1.11*	
*8000**	*1.16*	*0.89*	*1.09*	n/a
*10000**	0.82	0.67	1.13	

α_w 0.90

Class A

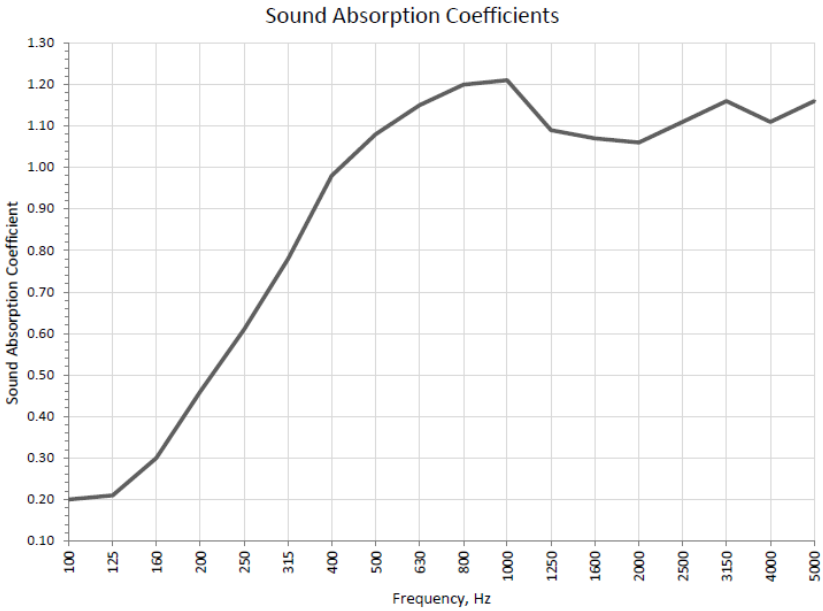
Calculated to BS EN ISO 11654:1997

NRC 1.00

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*

v1



24mm + 100mm Air Gap

Data Sheet 16

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

Test Number:	16	**Test Room:**	**Empty**	**With Sample**
Client:	The Acoustics Company	**Air Temperature:**	15.9 °C	15.9 °C
Test Date:	26/11/2021	**Air Humidity:**	49 % RH	48 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	980 mbar	979 mbar
Mounting Method:	E-124	**Sample Area:**	10.08 m²	
Sample Description:	Alpha Acoustic Panel 24mm 2800x1200x24mm			

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.78*	*4.68*	*0.02*	*n/a*
*63**	*4.51*	*4.14*	*0.09*	
*80**	*7.12*	*5.52*	*0.20*	
100	*7.31*	*5.82*	*0.17*	*0.25*
125	*6.38*	*4.94*	*0.22*	
160	*6.26*	*4.45*	*0.32*	
200	*6.54*	*3.96*	*0.48*	*0.65*
250	*6.72*	*3.59*	*0.63*	
315	*6.67*	*3.14*	*0.82*	
400	*6.44*	*2.66*	*1.07*	*1.00*
500	*5.43*	*2.44*	*1.09*	
630	*4.92*	*2.24*	*1.18*	
800	*4.89*	*2.19*	*1.22*	*1.00*
1000	*5.40*	*2.37*	*1.14*	
1250	*5.29*	*2.43*	*1.08*	
1600	*4.89*	*2.37*	*1.05*	*1.00*
2000	*4.50*	*2.20*	*1.12*	
2500	*3.98*	*2.04*	*1.15*	
3150	*3.24*	*1.80*	*1.19*	*1.00*
4000	*2.54*	*1.59*	*1.13*	
5000	*2.00*	*1.36*	*1.11*	
*6300**	*1.37*	*1.03*	*1.14*	n/a
*8000**	*1.12*	*0.88*	*1.09*	
*10000**	0.79	0.66	1.09	

α_w 0.95

Class A

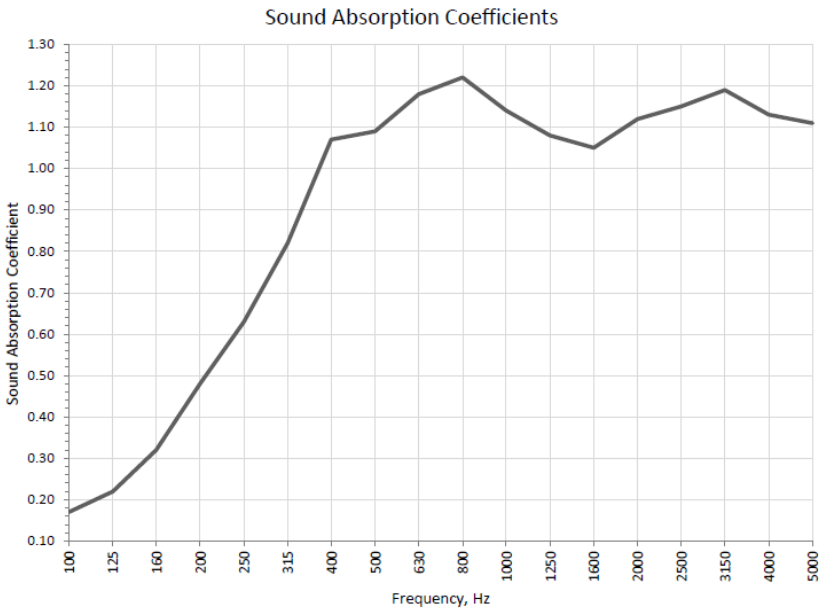
Calculated to BS EN ISO 11654:1997

NRC 1.00

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*

v1



24mm - 200mm Air Gap

Data Sheet 14

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

Test Number:	14	**Test Room:**	**Empty**	**With Sample**
Client:	The Acoustics Company	**Air Temperature:**	16.1 °C	16 °C
Test Date:	26/11/2021	**Air Humidity:**	51 % RH	48 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	984 mbar	979 mbar
Mounting Method:	E-224	**Sample Area:**	10.08 m²	
Sample Description:	Alpha Acoustic Panel 24mm 2800x1200x24mm			

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.85*	*4.39*	*0.10*	*n/a*
*63**	*4.47*	*3.97*	*0.14*	
*80**	*7.13*	*4.70*	*0.35*	
100	*7.26*	*4.63*	*0.38*	*0.50*
125	*6.17*	*3.80*	*0.49*	
160	*6.39*	*3.35*	*0.69*	
200	*6.72*	*3.09*	*0.84*	*0.95*
250	*6.66*	*2.89*	*0.95*	
315	*6.53*	*2.78*	*1.00*	
400	*6.32*	*2.57*	*1.11*	*1.00*
500	*5.46*	*2.43*	*1.11*	
630	*5.00*	*2.31*	*1.13*	
800	*5.01*	*2.47*	*0.99*	*1.00*
1000	*5.45*	*2.59*	*0.98*	
1250	*5.29*	*2.40*	*1.10*	
1600	*4.93*	*2.28*	*1.13*	*1.00*
2000	*4.60*	*2.19*	*1.14*	
2500	*4.04*	*2.05*	*1.14*	
3150	*3.31*	*1.80*	*1.19*	*1.00*
4000	*2.60*	*1.59*	*1.13*	
5000	*2.07*	*1.35*	*1.15*	
*6300**	*1.43*	*1.05*	*1.09*	*n/a*
*8000**	*1.16*	*0.89*	*1.07*	
*10000**	0.82	0.67	1.11	

α_w 1.00

Class A

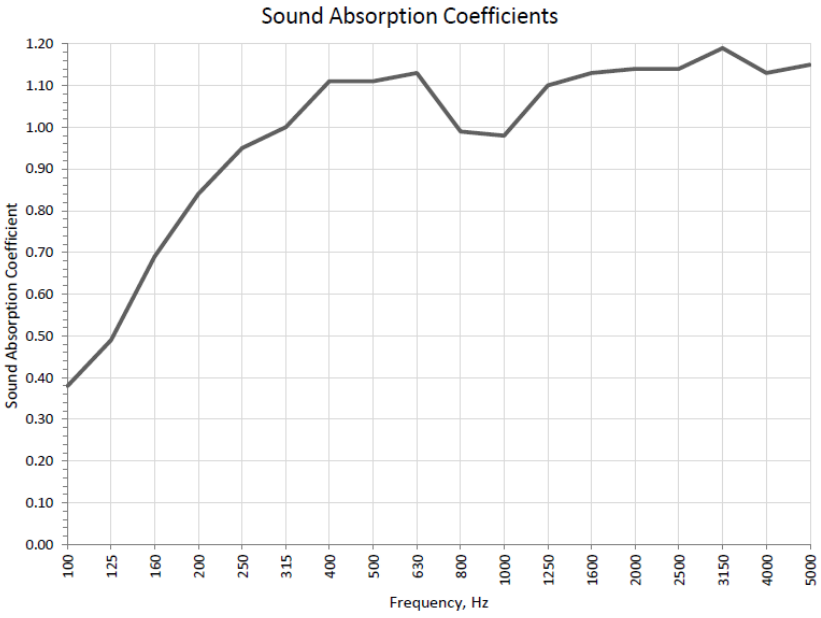
Calculated to BS EN ISO 11654:1997

NRC 1.05

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*

v1



0444

24mm + 300mm Air Gap

Data Sheet 13

See SRL Report 24870-SRL-RP-XT-002-P1 for full details

Laboratory Measurement of Random Incidence Sound Absorption to BS EN ISO 354:2003

Test Number:	13	**Test Room:**	**Empty**	**With Sample**
Client:	The Acoustics Company	**Air Temperature:**	16.1 °C	16 °C
Test Date:	26/11/2021	**Air Humidity:**	51 % RH	49 % RH
Chamber Volume:	300.1 m³	**Air Pressure:**	984 mbar	979 mbar
Mounting Method:	E-324	**Sample Area:**	10.08 m²	
Sample Description:	Alpha Acoustic Panel 24mm 2800x1200x24mm			

Frequency Hz	T1, empty room reverberation time sec	T2, room reverberation time with sample sec	Sound Absorption Coefficient α_s	Practical Sound Absorption Coefficient α_p
*50**	*4.85*	*4.27*	*0.14*	*n/a*
*63**	*4.47*	*3.80*	*0.19*	
*80**	*7.13*	*4.66*	*0.36*	
100	*7.26*	*4.34*	*0.45*	*0.65*
125	*6.17*	*3.39*	*0.64*	
160	*6.39*	*3.02*	*0.84*	
200	*6.72*	*2.81*	*1.00*	*1.00*
250	*6.66*	*2.77*	*1.02*	
315	*6.53*	*2.72*	*1.03*	
400	*6.32*	*2.61*	*1.09*	*1.00*
500	*5.46*	*2.53*	*1.02*	
630	*5.00*	*2.53*	*0.95*	
800	*5.01*	*2.32*	*1.12*	*1.00*
1000	*5.45*	*2.43*	*1.10*	
1250	*5.29*	*2.41*	*1.09*	
1600	*4.93*	*2.26*	*1.16*	*1.00*
2000	*4.60*	*2.14*	*1.20*	
2500	*4.04*	*1.98*	*1.23*	
3150	*3.31*	*1.78*	*1.23*	*1.00*
4000	*2.60*	*1.56*	*1.19*	
5000	*2.07*	*1.32*	*1.26*	
*6300**	*1.43*	*1.04*	*1.20*	*n/a*
*8000**	*1.16*	*0.88*	*1.16*	
*10000**	0.82	0.67	1.16	

α_w 1.00

Class A

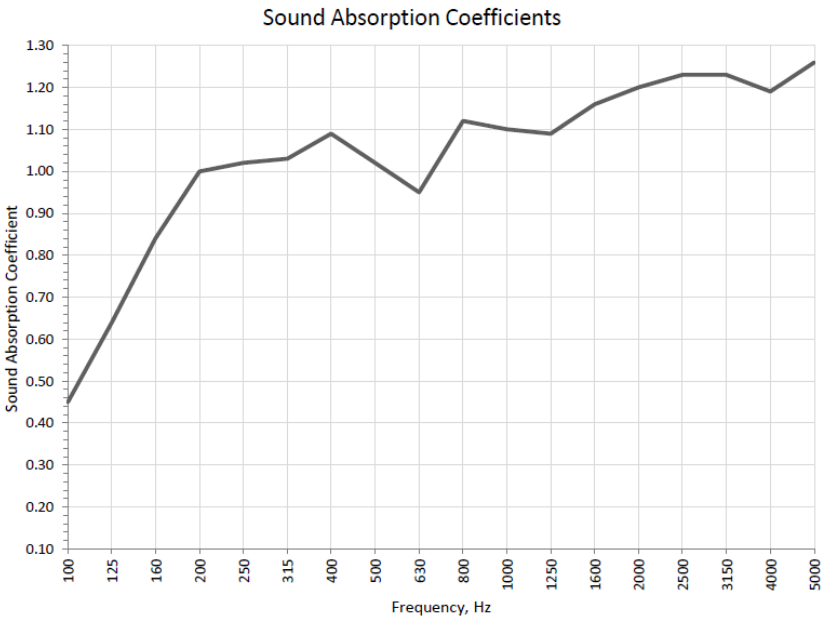
Calculated to BS EN ISO 11654:1997

NRC 1.10

Calculated to ASTM C 423-01

** Denotes frequencies outside the range covered by BS EN ISO 354:2003 and not UKAS accredited*

v1



Appendix A - Details of Measurements

A1. Location

Sound Research Laboratories

Holbrook House

Little Waldingfield

Sudbury

Suffolk

CO10 0TF

A2. Test Date

26 November 2021

A3. Tester

Kieron Farrow of SRL Technical Services Limited

A4. Instrumentation and Apparatus Used

Make	Description	Type
Abtronix	Microphone Multiplexer	
EDI	Microphone Power Supply Unit	
Norwegian Electronics	Multichannel Sound Level Meter	Nor850

Brüel & Kjaer	Windshields	UA0237
	Pre Amplifiers	2669C
	Microphone Calibrator	4231
	Omnipower Sound Source	4296
Larson Davis	12mm Condenser Microphone	2560, 377A60
Oregon Scientific	Temperature & Humidity & Probe	THGR810
TOA	Graphic Equalizer	E-1231
Crown	Power Amplifier	XLS 1502
G.R.A.S	Pre Amplifier	26AK
	Microphone	40AR

A5. References

BS EN ISO 354:2003	Measurement of sound absorption in a reverberation room.
BS EN ISO 11654:1997	Sound absorbers for use in buildings. Rating of sound absorption.
ATSM C423-01	Sound Absorption and sound Absorption Coefficients by the Reverberation Room

Appendix B -Test Procedure

Measurements of Random Incidence Sound Absorption Coefficients to BS EN ISO 354:2003 - TP14 (Plane Absorbers)

In the laboratory, random incidence sound absorption coefficients are determined from the rate of decay of a sound field in a reverberation room, with and without a test sample installed. The rate of decay is described by the time a sound field takes to decay by 60dB, known as the reverberation time.

The reverberation room is constructed from 215mm brick, which is internally plastered with a reinforced concrete roof and floor. The reverberation room is rectangular, measuring 8.3 metres long, 6.7 metres wide and 5.4 metres high. The volume is 300m^3, the total surface area, 275m^2. From the ceiling hang 10 randomly positioned diffusers, with a total surface area (for one side) of 20m^2. The room is isolated from the surrounding structure by the use of resilient mountings and seals, ensuring good acoustic isolation.

Using at least two omnidirectional loudspeaker positions, broad band random noise is produced in the room using an electronic generator and power amplifier. When the amplification system is switched off, the decay of sound is filtered into one-third octave band widths and the reverberation times measured. This process is repeated for each of six microphone positions and the values arithmetically averaged to obtain a final value for each frequency.

The sample, which has an area between 10m^2 and 15.7m^2, is then laid over a pre-assembled laboratory test rig positioned on the floor of the reverberation room so that no part of it is closer than one metre from any edge of the boundaries. The test rig provides a space beneath the sample, the depth of which can be varied to simulate specific requirements such as the void above a suspended ceiling system. The procedure of measuring the reverberation times then repeated.

The sound absorption coefficients are calculated from the difference in decay rates for each frequency according to the formula:

$$\alpha_s = \frac{A_T}{S}$$

where

α_s is the random incidence absorption coefficient
A_T is the increase in equivalent sound absorption area of the test specimen (m^2)
S is the area covered by the test specimen (m^2)

The equivalent absorption area of the test specimen is further defined as:

$$A_T = 55.3V\left(\frac{1}{c_2 T_2} - \frac{1}{c_1 T_1}\right) - 4V(m_2 - m_1)$$

where

- V is the volume of the empty reverberation room (m^3)
- c_1 is the speed of sound in the empty room (m/sec)
- T_1 is the reverberation time in the empty room (sec)
- m_1 is the power attenuation coefficient calculated according to ISO 9613-1 using the climatic conditions that have been present in the empty room during the measurement.

c_2, T_2 and m_2 have the same meanings as c_1, T_1 and m_1 but with the test specimen in the room.

It is occasionally found that the absorption coefficient derived in this manner reaches a value greater than unity. This is impossible, by definition, and investigation has shown that this anomaly is due to diffraction of the impinging sound waves at the edges of the sample. In practical terms this is insignificant.

Appendix C – Measurement Uncertainty

BS EN ISO 354:2003 - TP14

1. Introduction

The estimated values of uncertainty are based on a standard uncertainty multiplied by a coverage factor of K = 2, which provides a level of confidence of approximately 95%.

Table 1: Uncertainty For Equivalent Absorption Area Measurement

Frequency, Hz	Expanded uncertainty K = 2, 95% % of A_1 or A_2
100	9.0
125	8.1
160	5.6
200	6.7
250	4.3
315	8.1
400	4.6
500	5.0
630	5.3
800	3.2
1000	3.5
1250	3.1
1600	2.8
2000	2.7
2500	2.2
3150	1.8
4000	1.6
5000	1.6

2. Estimation of Expanded Uncertainty For Sample Equivalent Sound Absorption Area

The expanded uncertainty, U_A,m² is estimated by using the following formulae:-

$$U_A = \sqrt{\left(\frac{uA_1}{100}\right)^2 + \left(\frac{uA_2}{100}\right)^2}$$

where

U_A	is the expanded uncertainty for the sample equivalent sound absorption area, for K = 2, 95%, m²
u	is the estimated expanded uncertainty for the equivalent sound absorption area, taken from Table 1 above, K = 2, 95%, % of A_1 or A_2
A_1	is the equivalent sound absorption area of the empty room, m²
A_2	is the equivalent sound absorption area of the room with the sample, m²

3. Estimation of expanded Uncertainty For Sound Absorption Coefficients

The expanded uncertainty for sound absorption coefficients, U_{α_s} , is estimated using the following formulae:-

$$U_{\alpha_s} = \frac{\alpha_s U_A}{A}$$

where

U_{α_s}	is the expanded uncertainty for sound absorption coefficients, K=2, 95%
α_s	is the sound absorption coefficient
U_A	is the expanded uncertainty for the sample equivalent sound absorption area, K=2, 95%, m²
A	is the sample equivalent sound absorption area, m²

Appendix D – Mounting Methods

Description of Test Specimen Mountings for Sound Absorption Tests

BS EN ISO 354:2003 describes various test specimen mountings. The methods of mounting used for these tests is briefly described as follows:

Type A Mounting

Test specimen placed directly against a room surface. The specimen may be held in place with adhesive or mechanical fasteners providing there is no resulting air space between the specimen and room surface.

Type E Mounting

Test specimen mounted with an air space behind it. The suffix of the mounting type (eg; Type E-200) is the distance in mm between the exposed face of the test specimen and the room surface.

0444

Laboratory:

Holbrook House
The Street
Little Waldingfield
Sudbury
Suffolk
CO10 0TF
Tel: +44 (0)1787 247595

Website: www.srltsl.com
e-mail: srl@srltsl.com

Registered Name and Address:
SRL Technical Services Limited
Holbrook House
Little Waldingfield
Sudbury
Suffolk
CO10 0TF

Registered Number: 907694 England