Akustikverkstan Lab AB
Kinnegatan 23, 531 33 Lidköping, Sweden, +46 510 - 911 44

staffan.andersson@akustikverkstan.se
Direct: +46 510 78 54 09

ABSORPTION MEASUREMENTS FOR DECIBEL

CONCLUSIONS

The sound absorption for Eggbox and 2 different fiberpanels for Decibel has been measured according to the reverberation room method SS-EN ISO 354:2003. The measurements have been evaluated according to SS-EN ISO 11654:1997 and
SS 25269:2013/ISO 20189:2018. The results as weighted sound absorption coefficient, sound absorption class and sound absorption area are presented in the separate measurement protocols 2394-M1 to M9.

The results as weighted sound absorption coefficient and sound absorption class are presented in the table below.

Test object	α_w	Absorption class
Eggbox	0.50 (MH)	D
Eggbox, small spacing	0.45 (MH)	D
Eggbox, elevated 20 mm	0.55 (MH)	D
Eggbox, small spacing, elevated 20 mm	0.50 (MH)	D
Bluefiber pad 50, 40 mm thick	0.80 (H)	B
Bluefiber panel I.40, 40 mm thick	0.75 (MH)	C

1. CLIENT

Decibel by Johansson, Anders Anderssons väg 7, 285 35 Markaryd, Sweden
Contact: Per Kentner, phone 0046(0)704-551790, email per@decibelab.se

2. ASSIGNMENT

To measure the sound absorption coefficient and sound absorption area for various products from Decibel by Johanson according to SS-EN ISO 354:2003. The measurements shall be evaluated according to SS-EN ISO 11654:1997 and SS 25269:2013/ISO 20189:2018 where applicable. Akustikverkstan is accredited for these standards.

3. TEST OBJECTS

3 diffrent product where measured in different setups. The products are a sound absorber named Eggbox, an acoustic pad from and an acoustic panel.

Eggbox is a sound absorber with the dimensions 600 x 300 mm made of press moulded organic fibers. Eggbox has an edge height of 70 mm and a max height of 100 mm. Eggbox was tested as 10 m^2 with exposed edges directly on floor, elevated 20 mm with wooden laths

and as close together and spaced apart. Eggbox where also tested as sound absorption area elevated 20 mm close together and spaced apart. Where spacing is stated the space was estimated to 16 mm between each absorber.

Bluefiber pad 50 is an acoustic pad made thermally bounded polyester with a density of 2500 g/m^2. The pad has been pressed to a thickness of 40 mm.

Bluefiber panel I.40 is an acoustic panel made of thermally and mechanically bounded polyester with a density of 3000 g/m^2 and thickness of 40 mm.

Both Bluefiber test objects where lowered into the floor in order to seal their edges.

All dimensions and setups of the tested objects are given in table 1. Photos of the test setups are available in Appendix 3.

Test object and setup	Tested as	Width (mm)	Length (mm)	Thickness (mm)	Weight (g)
Eggbox	coefficient	3.89	2.69	100	400 /unit
Eggbox spaced apart 16 mm	coefficient	3.82	2.77	100	400 /unit
Eggbox, elevated 20 mm	coefficient	3.89	2.69	120	400 /unit
Eggbox, elevated 20 mm, spaced apart 16 mm	coefficient	3.82	2.53	120	400 /unit
Eggbox 10 pcs, elevated 20 mm	Area	1.5	1.2	30	400 /unit
Eggbox 10 pcs, elevated 20 mm spaced apart 16 mm	Area	1.56	1.22	30	400 /unit
Bluefiber pad 50	coefficient	3.85	2.6	40	2400 /m^2
Bluefiber pad 50, 1.5 x 1.5 m	Area	1.5	1.5	40	2400 /m^2
Bluefiber panel I.40	coefficient	3.85	2.6	40	3278 /m^2

Table 1: Tested objects with dimensions. Thickness is given as maximum thickness of product and wall attachment.

4. MEASUREMENT PROCEDURE

The absorption measurements were performed according to the standard SS-EN ISO 354:2003. The measurements were made with three speaker positions and four microphone positions. The results for sound absorption area were evaluated according to ISO 20189:2018 (similar to SS 25269:2013). The results for sound absorption coefficient were evaluated according to SS-EN ISO 11654:1997.

The measurements were performed by Staffan Andersson 2022-06-12 in Akustikverkstan's reverberation room in Skultorp, Skövde, Sweden. More information on the test facilities can be found in Appendix 2. The equipment used for the measurement can be found in Appendix 3.

5. RESULTS

Detailed measurement results for all test objects are available in the measurement protocols 2394-M1 to 2394-M9 attached as appendices to this report. The result is only valid for the tested samples.

Result for weighted sound absorption coefficient α_w is given in table 2.

Measurement protocol	Test objects and setup	α_w	Absorption class
M1	Eggbox	0.50 (MH)	D
M2	Eggbox spaced apart 16 mm	0.45 (MH)	D
M3	Eggbox, elevated 20 mm	0.55 (MH)	D
M4	Eggbox, elevated 20 mm, spaced apart 16 mm	0.50 (MH)	D
M7	Bluefiber pad 50	0.80 (H)	B
M9	Bluefiber panel I.40	0.75 (MH)	C

Table 2: Results evaluated according to SS-EN ISO 11654:1997

Measurement uncertainties can be found in Appendix 4.

This report should always be used in its complete context, though the measurement protocols may be used independently.

6. COMMENTS AND INTERPRETATIONS

6.1 N10-value

Kammarkollegiet, the Swedish authority dealing with public purchasing, has published advice regarding purchasing of sound absorbers.

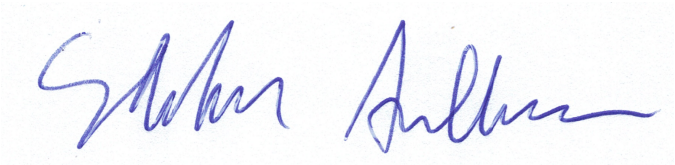
They define the value N_{10} according to the formula:

$$N_{10} = \frac{10}{A_{500}}$$

A_{500} is the sound absorption area at the 500 Hz octave band for the sound absorber. The N_{10} value is developed to be a single value metric for speech sound absorption and describes how many objects are needed to obtain 10 m^2 of sound absorption area in the 500 Hz octave band. If the sound absorption is lower in any octave above 500 Hz, the lower value will be used instead.

Measurement protocol	Test objects and setup	N_{10}
M5	Eggbox 10 pcs, elevated 20 mm	7.7
M6	Eggbox 10 pcs, elevated 20 mm spaced apart 16 mm	7.7
M8	Bluefiber pad 50, 1.5 x 1.5 m	4

Table 3: N_{10}-value for the measured product.



Staffan Andersson

Reviewed by Joachim Schubert 2022-07-06

APPENDIX 1: MEASURED REVERBERATION TIMES

f(Hz)	Empty room, 2022-06-14	M1, Eggbox	M2, Eggbox spaced apart	M3, Eggbox, elevated	M4, Eggbox, elevated , spaced apart	M5, Eggbox 10 pcs, elevated	M6, Eggbox 10 pcs, elevated, spaced apart	M7, Bluefiber pad 50, 40 mm	M8, Bluefiber pad 50, 1.5 x 1.5 m	M9, Bluefiber panel I.40
50	8.01	7.77	7.59	7.49	7.60	7.75	7.74	8.19	7.57	8.21
63	8.25	8.05	8.07	7.96	8.04	8.18	8.18	7.49	7.80	7.71
80	7.68	7.32	7.48	7.37	7.35	7.48	7.51	6.54	6.95	6.70
100	7.10	6.71	6.76	6.61	6.75	6.86	6.89	5.98	6.45	6.26
125	6.64	5.55	5.71	5.55	5.56	6.14	6.09	4.62	5.28	5.00
160	5.60	4.65	4.77	4.52	4.61	5.18	5.19	3.54	4.25	3.82
200	5.75	4.40	4.51	4.30	4.44	5.12	5.14	3.36	4.10	3.57
250	5.22	3.90	4.09	3.72	3.95	4.59	4.63	3.04	3.76	3.19
315	5.33	3.64	3.79	3.37	3.67	4.40	4.49	2.54	3.48	2.67
400	5.22	3.04	3.30	2.86	3.06	4.06	4.12	2.18	3.11	2.28
500	4.77	2.53	2.74	2.33	2.50	3.42	3.50	2.01	2.70	2.07
630	4.24	2.03	2.17	1.88	2.02	2.88	2.91	1.74	2.46	1.78
800	4.61	1.97	2.11	1.86	1.99	2.90	2.90	1.80	2.48	1.83
1000	4.53	1.88	1.94	1.77	1.91	2.81	2.77	1.78	2.46	1.81
1250	3.99	1.83	1.91	1.76	1.88	2.68	2.69	1.71	2.31	1.74
1600	3.65	1.87	1.95	1.78	1.86	2.57	2.54	1.68	2.23	1.69
2000	3.24	1.75	1.77	1.65	1.69	2.37	2.35	1.55	2.08	1.55
2500	2.91	1.66	1.64	1.54	1.58	2.17	2.16	1.50	1.97	1.51
3150	2.52	1.42	1.44	1.37	1.41	1.89	1.89	1.37	1.78	1.37
4000	2.11	1.26	1.26	1.25	1.28	1.66	1.68	1.25	1.59	1.24
5000	1.74	1.10	1.11	1.10	1.11	1.42	1.43	1.10	1.35	1.09

Number of test objects / test area	0	11.3	11.47	11.56	11.73	2	2	10	2	10
Temp (°C)	20.3	20.0	20.0	19.8	19.8	19.8	19.8	19.6	19.8	19.7
RH (%)	51	52	52	53	53	53	53	54	54	54

APPENDIX 2: INFORMATION ABOUT THE REVERBERATION ROOM

The reverberation room is rectangular, measuring Length x Width x Height = 5.85 x 4.65 x 7.35 m. The room volume is 200 m^3 and the total area of the walls, ceiling and floor is 209 m^2. There are 22 diffusors (size 0.775 x 1.25 m) randomly installed in the room. The reverberation time between 50 and 200 Hz is controlled with membrane absorbers on the walls.
The test specimen is put on the floor on the mounting area (10 m^2, 2.6 x 3.85 m) according to figure A2.1. The mounting area consists of a concrete slab that can be lowered up to 700 mm below the floor.

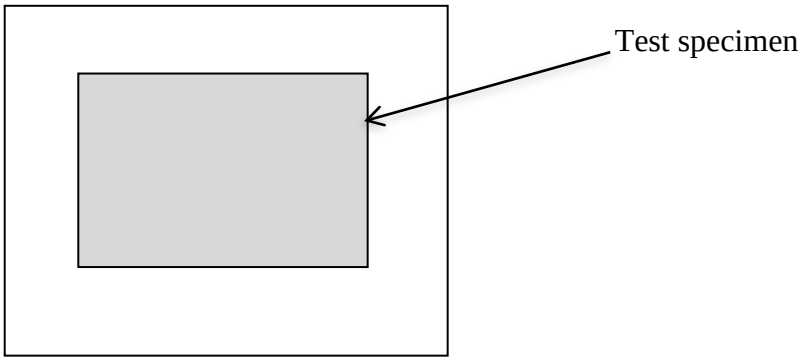


Figure A2.1: Plane drawing of the reverberation room with the test specimen put on the mounting area.

APPENDIX 3: MEASURMENT EQUIPMENT

Table A3.1 lists the equipment used during the measurements. The equipment fulfils class 1 according to SS-EN 61672-1, 60942 and 61260. Date for the latest calibration is available in the instrument journal of Akustikverkstan.

Instrument	Manufacture and type	Serial number	Internal designation
Measurment computer	HP Zbook		DA02
Front end	National Instruments NI 9234	1918620/190DB0B	AN05
Microphone	Roga MI-17	592	MI04
Microphone	Roga MI-17	593	MI05
Microphone	Roga MI-17	594	MI06
Microphone	Roga MI-17	595	MI07
Speaker	IMA Kub 1	8	HÖ7
Speaker	IMA Kub 1	9	HÖ8
Speaker	IMA Kub 1	10	HÖ9
Equalizer	Monacor MEQ-2152	-	Lab
Amplifier	Denon POA-2200	-	Lab

Table A3.1: Equipment used during the measurements.

APPENDIX 4: MEASUREMENT UNCERTAINTY

The uncertainties in the measured sound absorption coefficients have been estimated to the values in table A4.1. The uncertainty corresponds to one standard deviation. The uncertainties for the sound absorption area measurement are concluded from the same values multiplied with the test specimen area.

50 Hz	**63 Hz**	**80 Hz**	**100 Hz**	**125 Hz**	**160 Hz**	**200 Hz**
± 0.10	± 0.08	± 0.07	± 0.06	± 0.05	± 0.04	± 0.03
250 Hz	**315 Hz**	**400 Hz**	**500 Hz**	**630 Hz**	**800 Hz**	**1 kHz**
± 0.03	± 0.03	± 0.03	± 0.03	± 0.03	± 0.03	± 0.03
1.25 kHz	**1.6 kHz**	**2 kHz**	**2.5 kHz**	**3.15 kHz**	**4 kHz**	**5 kHz**
± 0.03	± 0.03	± 0.03	± 0.03	± 0.03	± 0.03	± 0.03

Table A4.1: Measurement uncertainty for each third octave.

APPENDIX 5: PHOTOS OF THE TEST SET UP

Figure A5:1: Eggbox setup.

Figure A5:2: Eggbox spaced apart 16 mm.

Figure A5:3: Close up of Eggbox spaced apart 16 mm.

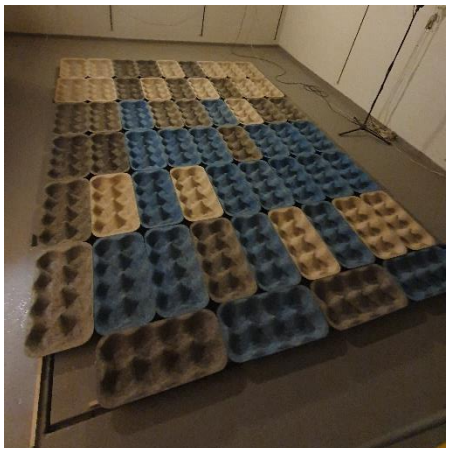


Figure A5:4: Eggbox elevated 20 mm

Figure A5:5: Close up of Eggbox elevated 20 mm.

Figure A5:6: Eggbox spaced apart and elevated 20 mm.

Figure A5:7: Close up Eggbox spaced apart and elevated 20 mm.

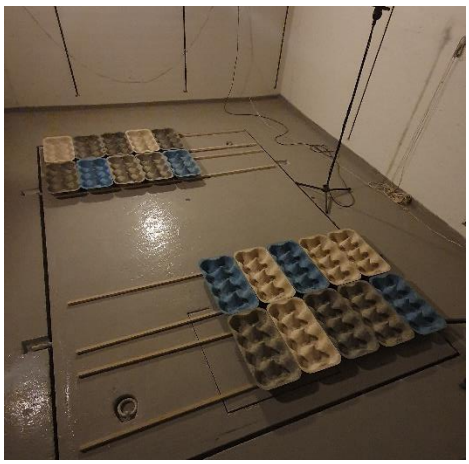


Figure A5:8: Eggbox measured as area.

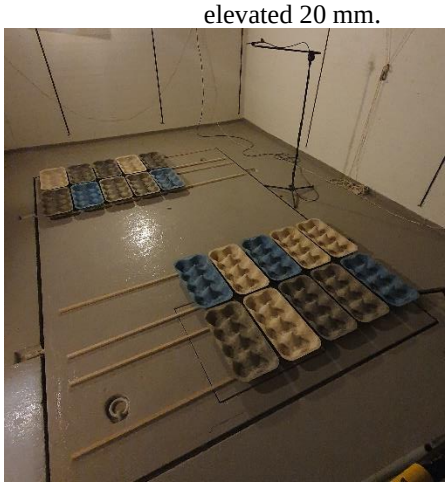


Figure A5:9: Eggbox measured as area, spaced apart.

Figure A5.10: Bluefiber pad 50.

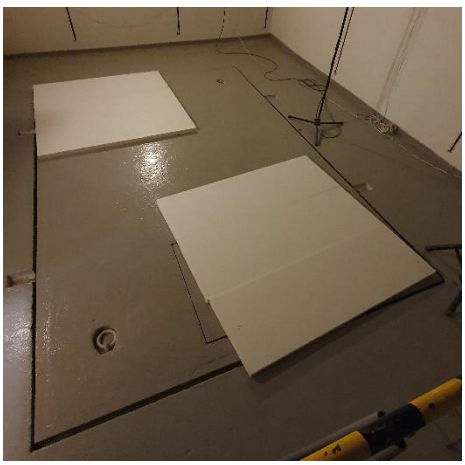


Figure A5.11: Bluefiber pad 50 as 1.5 x 1.5 m

Figure A5.12: Bluefiber panel I.40

Eggbox

SOUND ABSORPTION COEFFICIENT ACCORDING TO SS-EN ISO 354:2003 AND SS-EN ISO 11654:1997

Measurement of sound absorption coefficient in a reverberation room

Ackred. nr. 10445
Provning
ISO/IEC 17025

Report number:
2394-M1
Date
2022-06-28

Frequency f [Hz]	Sound absorption coefficient α_s	α_p
50	0.01	
63	0.01	0.00
80	0.02	
100	0.02	
125	0.08	0.05
160	0.10	
200	0.15	
250	0.19	0.20
315	0.25	
400	0.39	
500	0.53	0.55
630	0.73	
800	0.83	
1000	0.89	0.85
1250	0.85	
1600	0.74	
2000	0.75	0.75
2500	0.74	
3150	0.88	
4000	0.92	0.90
5000	0.95	

α_w = 0.50(MH)

Absorption class = D

Client: Decibel by Johansson

Manufacturer: Decibel by Johansson

Product identification: Eggbox

Description of test specimen: Eggbox 600x300x10 mm made of press moulded fibers. 58 pieces forming an area of 10.37 m^2. Height at edge is 70 mm, the perimeter is added to size of specimen. Type A mounting, placed directly on floor.

Reverberation room volume: 200 m^3

Temperature: 20.0 °C (empty: 20.3 °C)

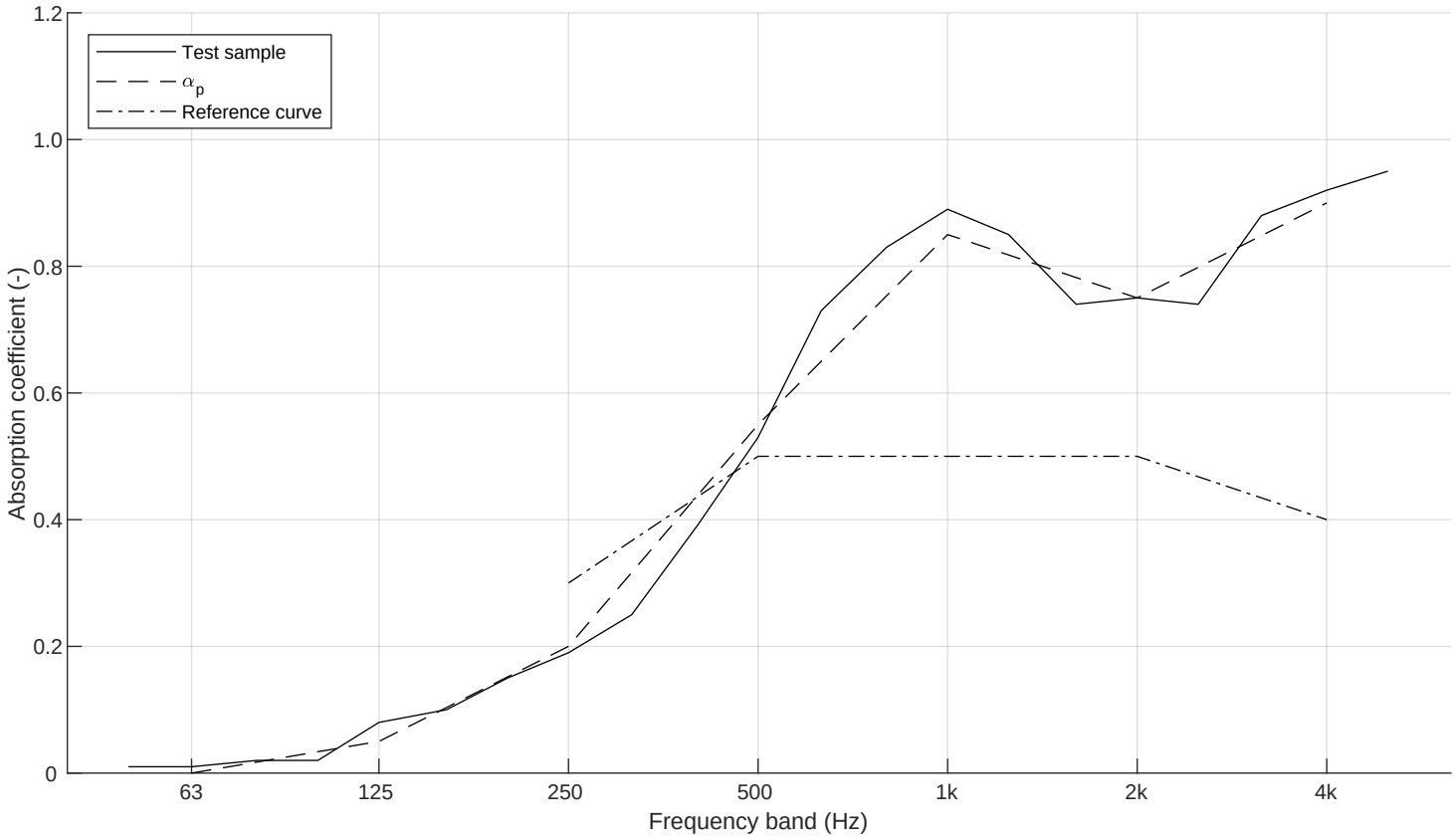
Air humidity: 52 % (empty: 51 %)

Air pressure: 99.1 kPa (empty: 99.1 kPa)

Size of specimen: 11.3 m^2

Measurement date: 2022-06-14

Measured by: Staffan Andersson



AKUSTIKVERKSTAN

Eggbox, spaced apart

SOUND ABSORPTION COEFFICIENT ACCORDING TO SS-EN ISO 354:2003 AND SS-EN ISO 11654:1997

Measurement of sound absorption coefficient in a reverberation room

Ackred. nr. 10445
Provning
ISO/IEC 17025

Report number:
2394-M2
Date
2022-06-28

Frequency f [Hz]	Sound absorption coefficient α_s	α_p
50	0.02	
63	0.01	0.00
80	0.01	
100	0.02	
125	0.07	0.05
160	0.09	
200	0.13	
250	0.15	0.15
315	0.22	
400	0.31	
500	0.44	0.45
630	0.64	
800	0.73	
1000	0.83	0.80
1250	0.77	
1600	0.67	
2000	0.72	0.70
2500	0.75	
3150	0.84	
4000	0.90	0.90
5000	0.92	

α_w = 0.45(MH)

Absorption class = D

Client: Decibel by Johansson

Manufacturer: Decibel by Johansson

Product identification: Eggbox

Description of test specimen: Eggbox 600x300x10 mm made of press moulded fibers. 52 pieces with 16 mm spacing between forming an area of 10.55 m^2. Height at edge is 70 mm, the perimeter is added to size of specimen. Type A mounting, placed directly on floor.

Reverberation room volume: 200 m^3

Temperature: 20.0 °C (empty: 20.3 °C)

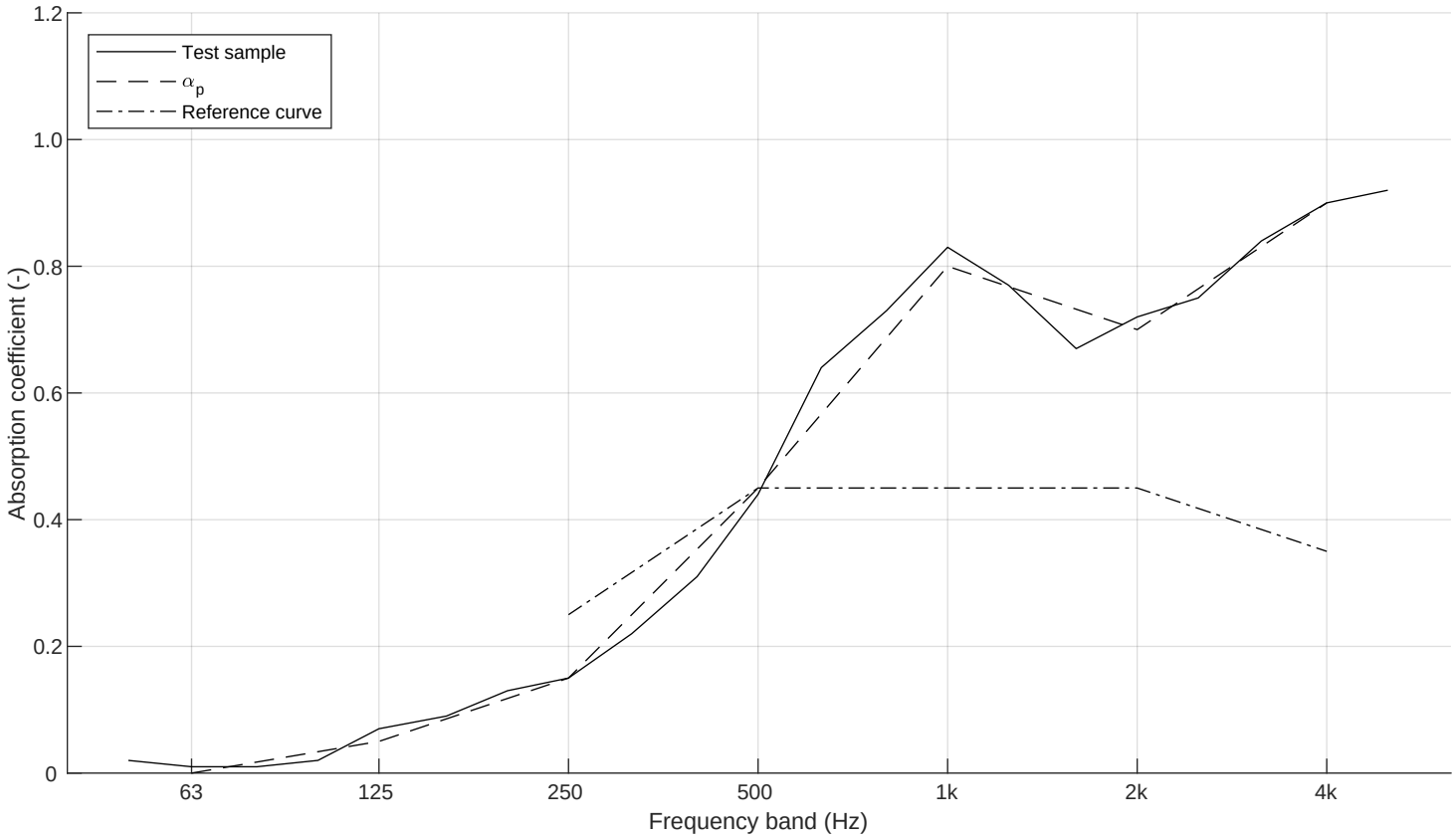
Air humidity: 52 % (empty: 51 %)

Air pressure: 99.1 kPa (empty: 99.1 kPa)

Size of specimen: 11.47 m^2

Measurement date: 2022-06-14

Measured by: Staffan Andersson



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Eggbox, elevated

SOUND ABSORPTION COEFFICIENT ACCORDING TO SS-EN ISO 354:2003 AND SS-EN ISO 11654:1997

Measurement of sound absorption coefficient in a reverberation room

Ackred. nr. 10445
Provning
ISO/IEC 17025

Report number:
2394-M3
Date
2022-06-28

Frequency f [Hz]	Sound absorption coefficient α_s	α_p
50	0.02	
63	0.01	0.00
80	0.02	
100	0.03	
125	0.08	0.10
160	0.12	
200	0.16	
250	0.22	0.25
315	0.31	
400	0.44	
500	0.62	0.65
630	0.83	
800	0.90	
1000	0.96	0.90
1250	0.89	
1600	0.80	
2000	0.83	0.85
2500	0.86	
3150	0.93	
4000	0.92	0.95
5000	0.94	

α_w = 0.55(MH)

Absorption class = D

Client: Decibel by Johansson

Manufacturer: Decibel by Johansson

Product identification: Eggbox

Description of test specimen: Eggbox 600x300x10 mm made of press moulded fibers elevated on 20 mm wooden laths. 58 pieces forming an area of 10.37 m^2. Height at edge is 90 mm, the perimeter is added to size of specimen. Type A mounting, placed directly on floor.

Reverberation room volume: 200 m^3

Temperature: 19.8 °C (empty: 20.3 °C)

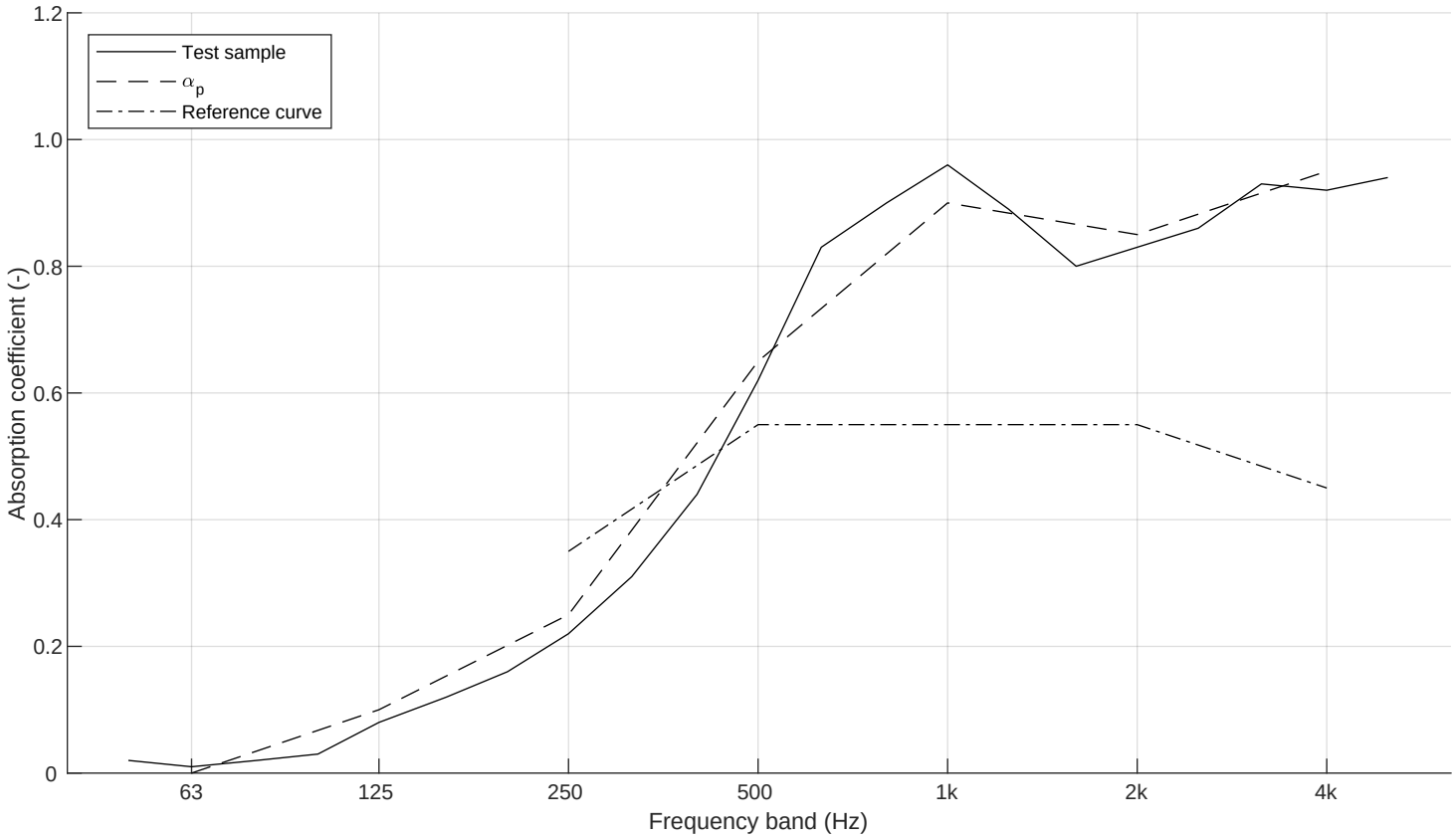
Air humidity: 53 % (empty: 51 %)

Air pressure: 99.1 kPa (empty: 99.1 kPa)

Size of specimen: 11.56 m^2

Measurement date: 2022-06-14

Measured by: Staffan Andersson



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Eggbox, elevated, spaced apart

SOUND ABSORPTION COEFFICIENT ACCORDING TO SS-EN ISO 354:2003 AND SS-EN ISO 11654:1997

Measurement of sound absorption coefficient in a reverberation room

Ackred. nr. 10445
Provning
ISO/IEC 17025

Report number:
2394-M4
Date
2022-06-28

Frequency f [Hz]	Sound absorption coefficient α_s	α_p
50	0.02	
63	0.01	0.00
80	0.02	
100	0.02	
125	0.08	0.05
160	0.11	
200	0.14	
250	0.17	0.20
315	0.23	
400	0.37	
500	0.52	0.55
630	0.71	
800	0.79	
1000	0.84	0.80
1250	0.77	
1600	0.73	
2000	0.78	0.75
2500	0.80	
3150	0.87	
4000	0.85	0.90
5000	0.91	

α_w = 0.50(MH)

Absorption class = D

Client: Decibel by Johansson

Manufacturer: Decibel by Johansson

Product identification: Eggbox

Description of test specimen: Eggbox 600x300x10 mm made of press moulded fibers elevated on 20 mm wooden laths. 52 pieces with 16 mm spacing between forming an area of 10.55 m^2. Height at edge is 90 mm, the perimeter is added to size of specimen. Type A mounting, placed directly on floor.

Reverberation room volume: 200 m^3

Temperature: 19.8 °C (empty: 20.3 °C)

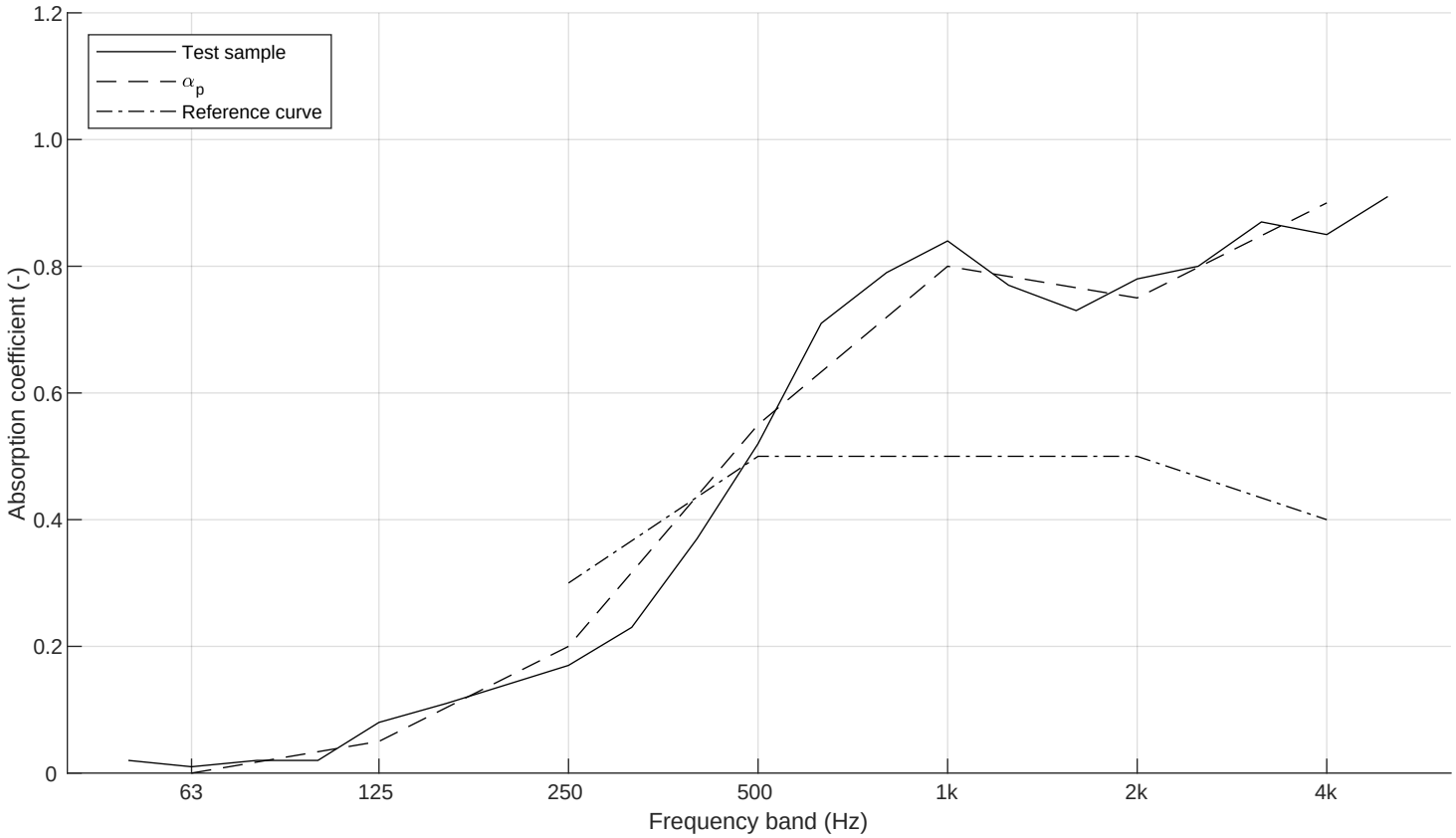
Air humidity: 53 % (empty: 51 %)

Air pressure: 99.1 kPa (empty: 99.1 kPa)

Size of specimen: 11.73 m^2

Measurement date: 2022-06-14

Measured by: Staffan Andersson



AKUSTIKVERKSTAN

Eggbox 5x2, elevated

SOUND ABSORPTION AREA ACCORDING TO SS-EN ISO 354:2003 and ISO 20189:2018

Measurement of sound absorption area in a reverberation room

Ackred. nr. 10445
Provning
ISO/IEC 17025

Report number:
2394-M5
Date
2022-06-28

Frequency f [Hz]	Sound absorption area per object [m² Sabine]	
50	0.07	
63	0.02	0.05
80	0.06	
100	0.08	
125	0.20	0.17
160	0.23	
200	0.35	
250	0.43	0.47
315	0.64	
400	0.89	
500	1.34	1.3
630	1.80	
800	2.06	
1000	2.19	2.1
1250	1.99	
1600	1.87	
2000	1.84	1.9
2500	1.92	
3150	2.17	
4000	2.12	2.1
5000	2.15	

N_{10} = 7.7

Client: Decibel by Johansson

Manufacturer: Decibel by Johansson

Product identification: Eggbox

Description of test specimen: 10 Eggbox pieces each 600x300x10 mm, made of press moulded fibers placed on 20 mm wooden laths. Placed 2x5 forming an area of 1,8 m^2. Placed directly on floor.

Reverberation room volume: 200 m^3

Temperature: 19.8 °C (empty: 20.3 °C)

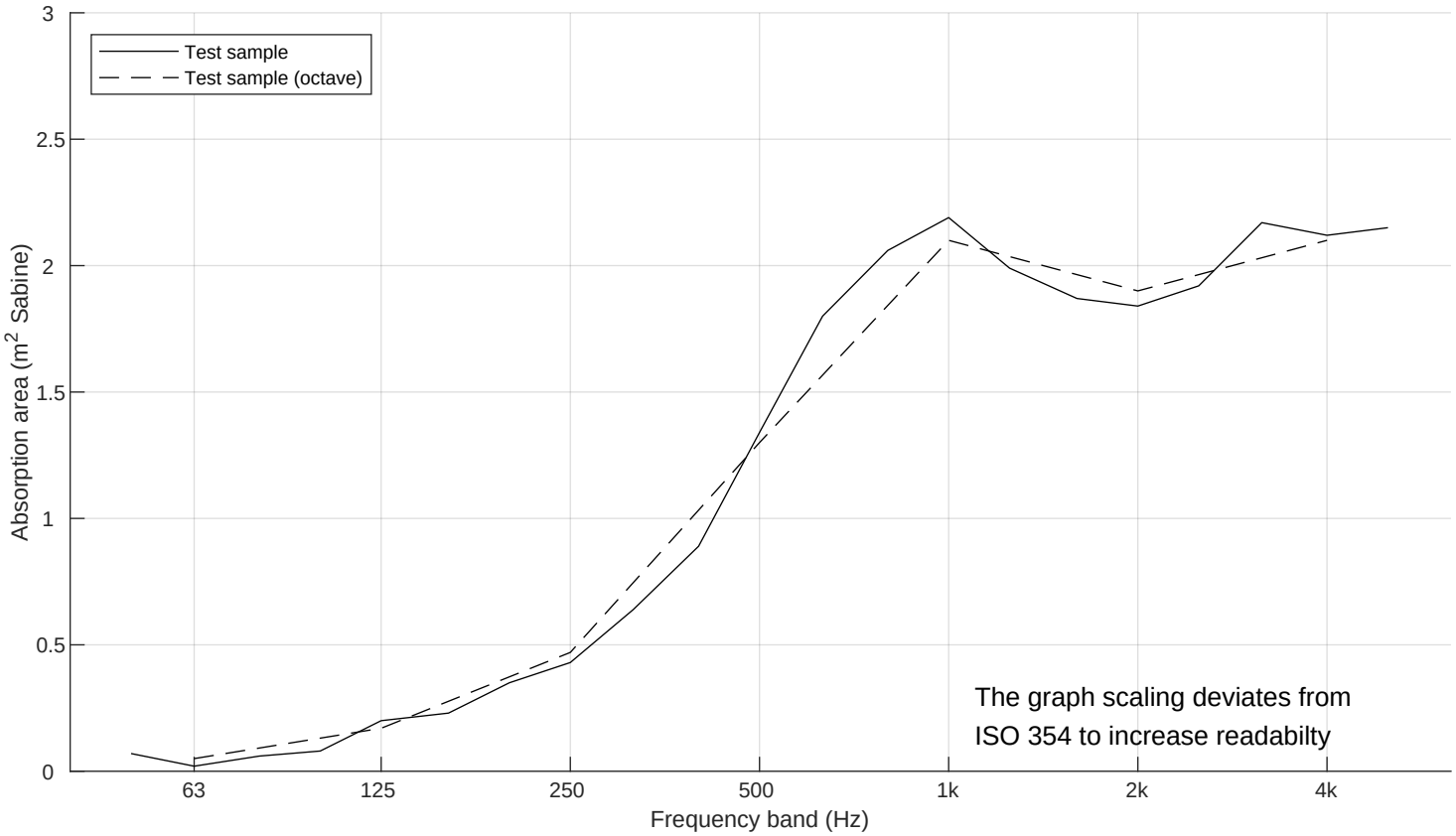
Air humidity: 53 % (empty: 51 %)

Air pressure: 99.1 kPa (empty: 99.1 kPa)

Number of objects: 2

Measurement date: 2022-06-14

Measured by: Staffan Andersson



AKUSTIKVERKSTAN

Eggbox 5x2, elevated, spaced apart

SOUND ABSORPTION AREA ACCORDING TO SS-EN ISO 354:2003 and ISO 20189:2018

Measurement of sound absorption area in a reverberation room

Ackred. nr. 10445
Provning
ISO/IEC 17025

Report number:
2394-M6
Date
2022-06-28

Frequency f [Hz]	Sound absorption area per object [m² Sabine]	
50	0.07	
63	0.02	0.05
80	0.05	
100	0.07	
125	0.22	0.17
160	0.23	
200	0.34	
250	0.40	0.44
315	0.57	
400	0.83	
500	1.24	1.3
630	1.75	
800	2.06	
1000	2.27	2.1
1250	1.96	
1600	1.95	
2000	1.91	1.9
2500	1.94	
3150	2.18	
4000	2.03	2.1
5000	2.05	

N_{10} = 7.7

Client: Decibel by Johansson

Manufacturer: Decibel by Johansson

Product identification: Eggbox

Description of test specimen: 10 Eggbox pieces each 600x300x10 mm, made of press moulded fibers placed on 20 mm wooden laths. Placed 2x5 with 16 mm spacing between forming an area of 1,85 m². Placed directly on floor.

Reverberation room volume: 200 m³

Temperature: 19.8 °C (empty: 20.3 °C)

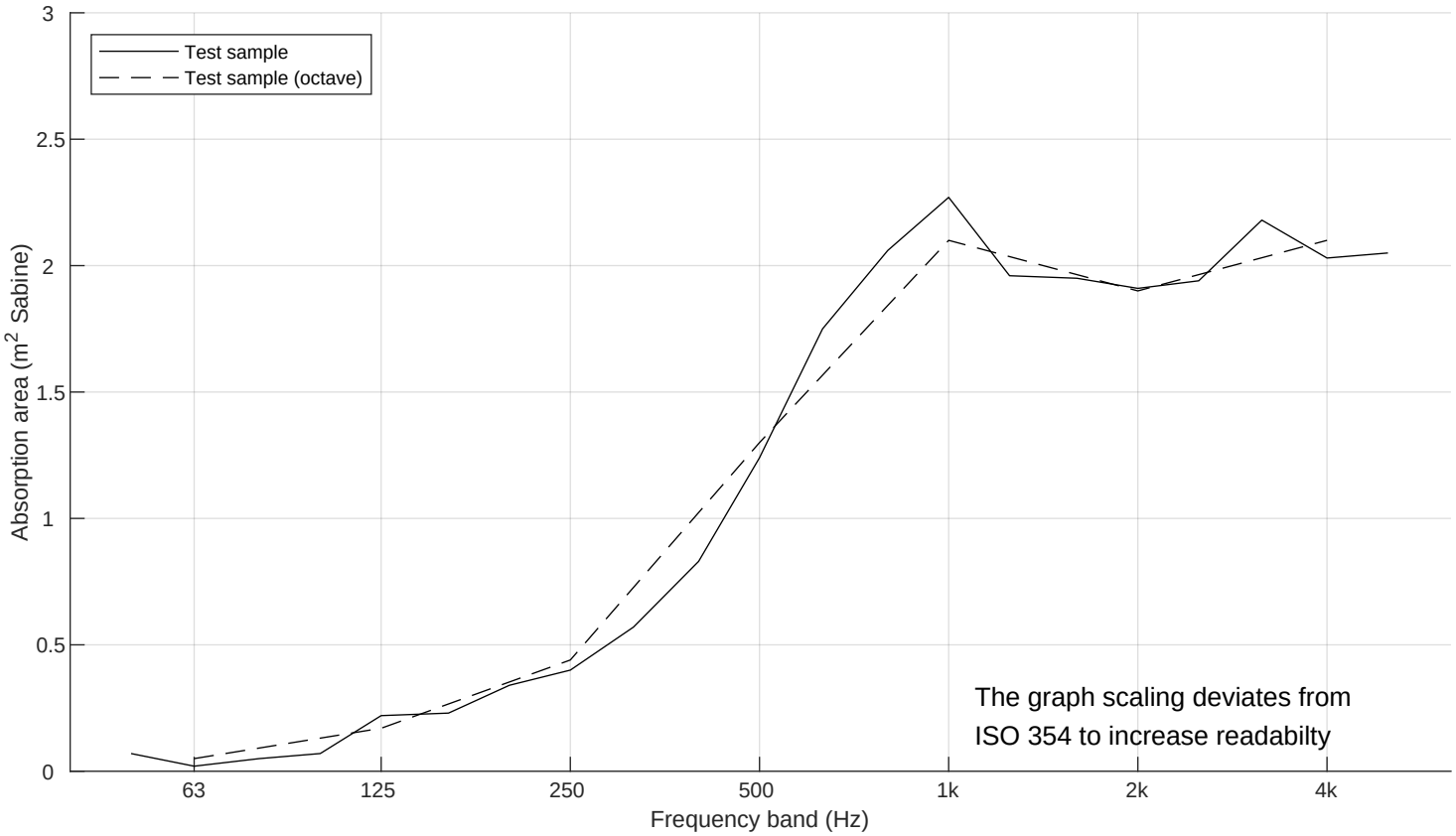
Air humidity: 53 % (empty: 51 %)

Air pressure: 99.1 kPa (empty: 99.1 kPa)

Number of objects: 2

Measurement date: 2022-06-14

Measured by: Staffan Andersson



AKUSTIKVERKSTAN

bluefiber pad 50, 40 mm

SOUND ABSORPTION COEFFICIENT ACCORDING TO SS-EN ISO 354:2003 AND SS-EN ISO 11654:1997

Measurement of sound absorption coefficient in a reverberation room

Ackred. nr. 10445
Provning
ISO/IEC 17025

Report number:
2394-M7
Date
2022-06-28

Frequency f [Hz]	Sound absorption coefficient α_s	α_p
50	0.00	
63	0.03	0.05
80	0.06	
100	0.09	
125	0.21	0.20
160	0.33	
200	0.39	
250	0.44	0.50
315	0.66	
400	0.85	
500	0.93	0.95
630	1.09	
800	1.08	
1000	1.11	1.00
1250	1.08	
1600	1.05	
2000	1.10	1.00
2500	1.06	
3150	1.06	
4000	1.07	1.00
5000	1.10	

α_w = 0.80(H)

Absorption class = B

Client: Decibel by Johansson

Manufacturer: Sandler AG

Product identification: bluefiber pad 50

Description of test specimen: A pad made of thermally bounded polyester with a density of 2500 g/m^2. The pad has a thickness of 40 mm. Placed directly on floor (type A mounting).

Reverberation room volume: 200 m^3

Temperature: 19.6 °C (empty: 19.8 °C)

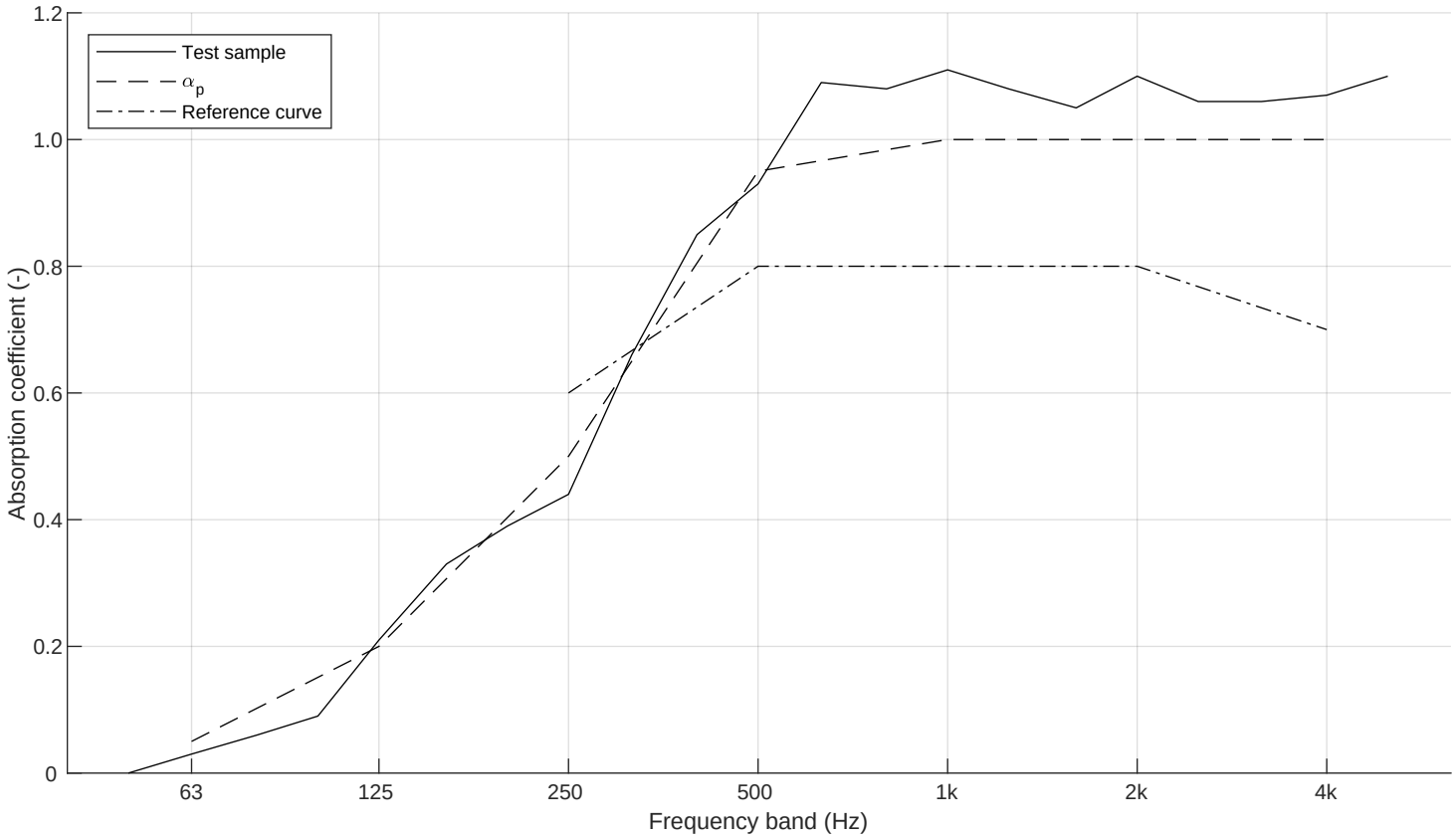
Air humidity: 54 % (empty: 54 %)

Air pressure: 99.1 kPa (empty: 99.1 kPa)

Size of specimen: 10 m^2

Measurement date: 2022-06-14

Measured by: Staffan Andersson



AKUSTIKVERKSTAN

bluefiber pad 50, 1.5x1.5 m

SOUND ABSORPTION AREA ACCORDING TO SS-EN ISO 354:2003 and ISO 20189:2018

Measurement of sound absorption area in a reverberation room

Ackred. nr. 10445
Provning
ISO/IEC 17025

Report number:
2394-M8
Date
2022-06-28

Frequency f [Hz]	Sound absorption area per object [m² Sabine]	
50	0.01	
63	0.05	0.07
80	0.16	
100	0.23	
125	0.63	0.59
160	0.90	
200	1.10	
250	1.20	1.3
315	1.57	
400	2.05	
500	2.59	2.5
630	2.76	
800	2.98	
1000	3.02	3.0
1250	2.96	
1600	2.83	
2000	2.85	2.8
2500	2.70	
3150	2.65	
4000	2.61	2.7
5000	2.82	

$N_{10} = 4$

Client: Decibel by Johansson

Manufacturer: Sandler AG

Product identification: bluefiber pad 50

Description of test specimen: A pad made of thermally bounded polyester with a density of 2500 g/m^2. Placed 1.5 x 1.5 to form an 2.25 m^2 area. The pad has a thickness of 40 mm. Placed directly on floor.

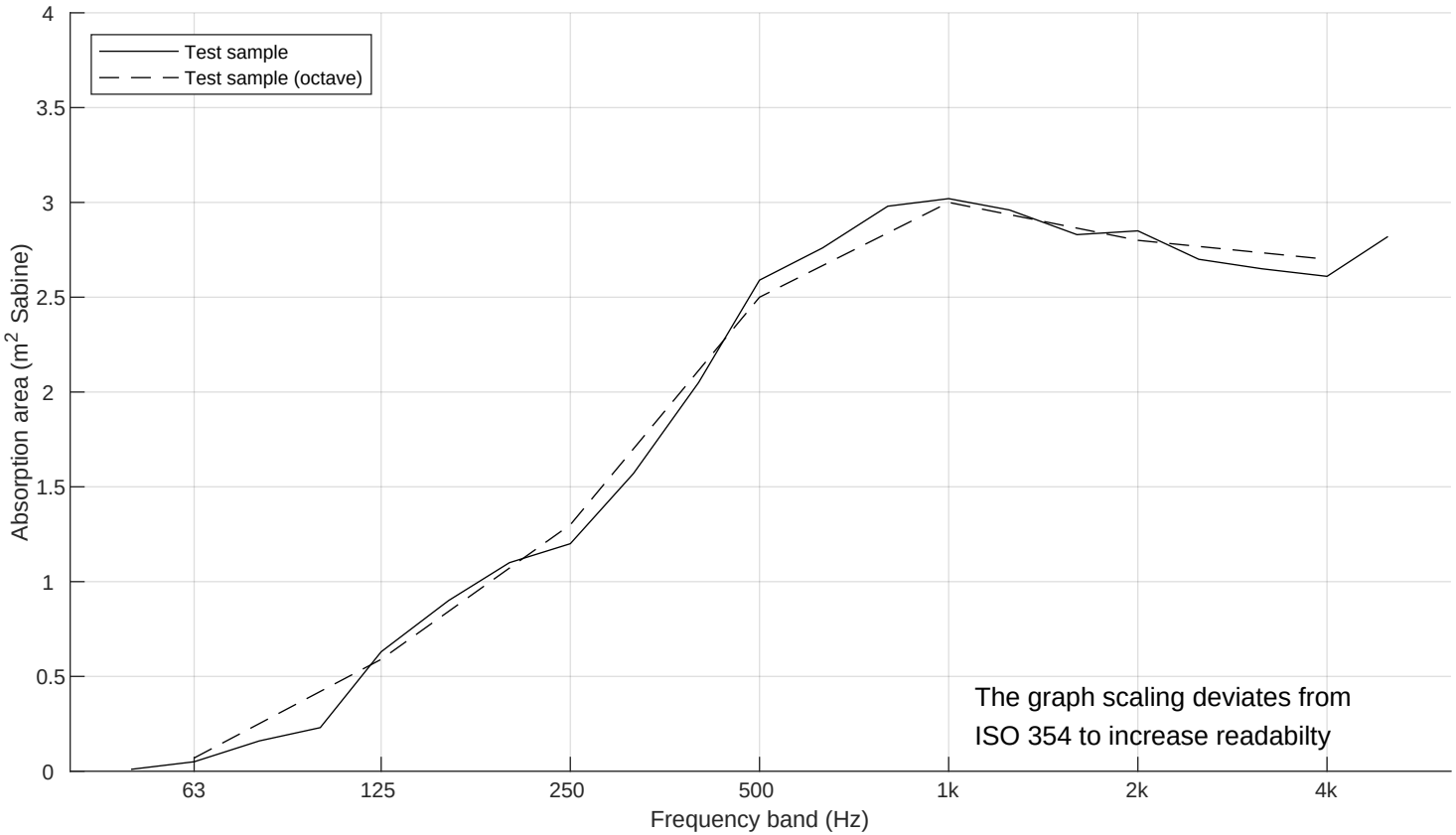
Reverberation room volume: 200 m^3

Temperature:	19.8 °C	(empty:	19.8 °C)
Air humidity:	54 %	(empty:	54 %)
Air pressure:	99.1 kPa	(empty:	99.1 kPa)

Number of objects: 2

Measurement date: 2022-06-14

Measured by: Staffan Andersson



AKUSTIKVERKSTAN

bluefiber panel I.40

SOUND ABSORPTION COEFFICIENT ACCORDING TO SS-EN ISO 354:2003 AND SS-EN ISO 11654:1997

Measurement of sound absorption coefficient in a reverberation room

Ackred. nr. 10445
Provning
ISO/IEC 17025

Report number:
2394-M9
Date
2022-06-28

Frequency f [Hz]	Sound absorption coefficient α_s	α_p
50	0.00	
63	0.02	0.00
80	0.05	
100	0.06	
125	0.16	0.15
160	0.27	
200	0.34	
250	0.39	0.45
315	0.60	
400	0.79	
500	0.88	0.90
630	1.05	
800	1.06	
1000	1.07	1.00
1250	1.05	
1600	1.03	
2000	1.10	1.00
2500	1.03	
3150	1.07	
4000	1.10	1.00
5000	1.13	

α_w = 0.75(MH)

Absorption class = C

Client: Decibel by Johansson

Manufacturer: Sandler AG

Product identification: bluefiber panel I.40

Description of test specimen: Panel made of thermally and mechanically bounded polyester with a density of 3000 g/m^2 and thickness of 40 mm. Placed directly on floor (Type A mounting).

Reverberation room volume: 200 m^3

Temperature: 19.7 °C (empty: 19.8 °C)

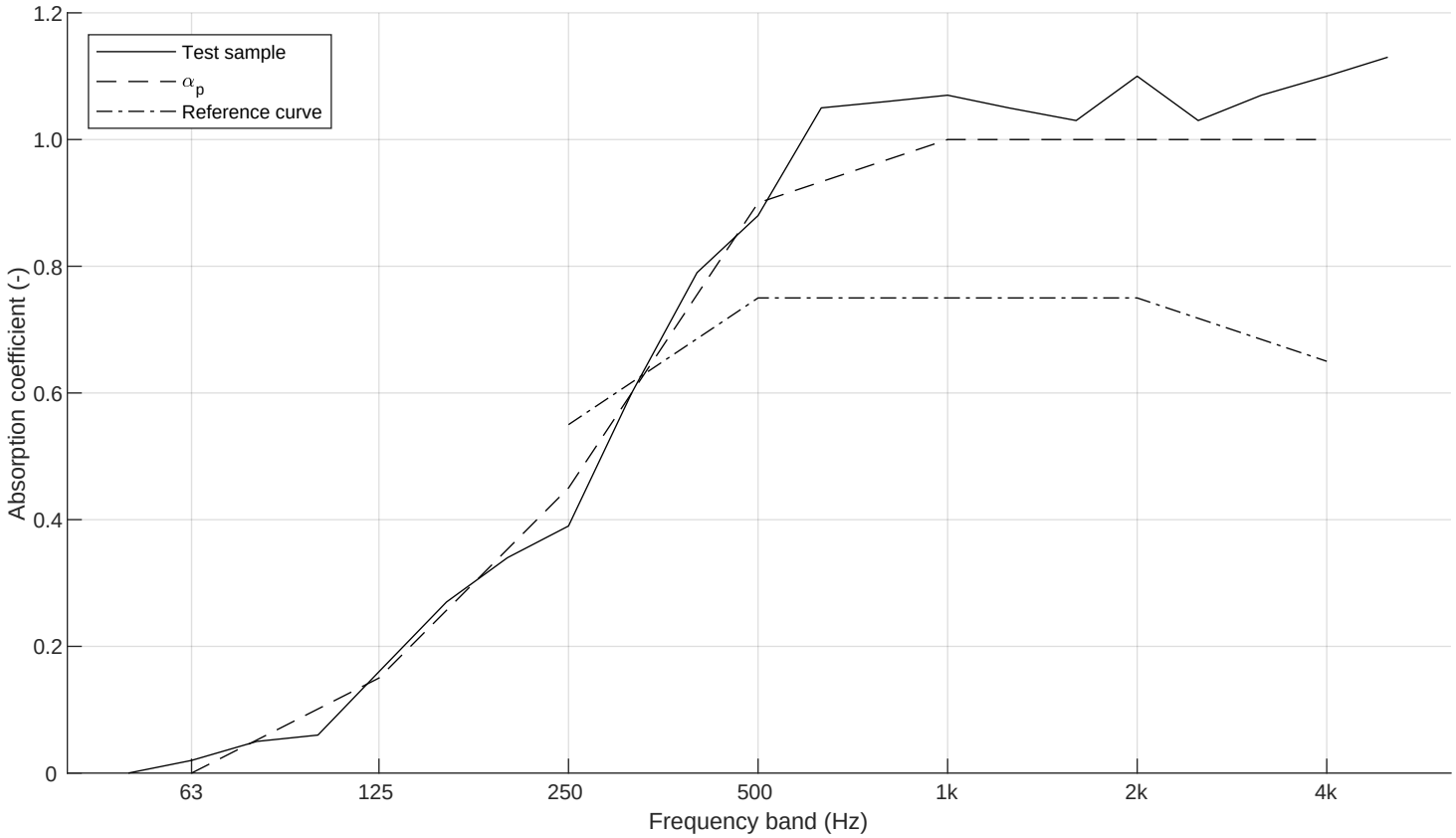
Air humidity: 54 % (empty: 54 %)

Air pressure: 99.1 kPa (empty: 99.1 kPa)

Size of specimen: 10 m^2

Measurement date: 2022-06-14

Measured by: Staffan Andersson



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