

Stretch Ceiling CLIPSO® Type „495 D“ white
with
50 mm Absorbent Material

Construction Height 55 mm

Measurement of Sound Absorption in a Reverberation Room According to
DIN EN ISO 354

Test Report No. BAE 14-321-01

Client:	CLIPSO Productions S.A.S. 5 Rue de l'Église F-68800 Vieux-Thann
Person in Charge:	Dipl.-Ing. (FH) Bernd Fiedler
Date of Test:	16 th April 2014
Date of Report:	23 th April 2014
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Contents:

1. Assignment.....	3
2. Test Object and Measurement Conditions	3
3. Measurement Procedure	4
4. Test Results.....	4
5. Final remark	5

Appendix A: Test Certificate	A01-A02
Appendix B: Photos and Drawings	B01-B02
Appendix C: Tables	C01
Appendix D: Measurement devices	D01

1. Assignment

The sound absorption properties of the stretch ceiling CLIPSO®, Type „455 D“ white shall be measured according to ISO 354 on behalf of the company CLIPSO.

2. Test Object and Measurement Conditions

The test sample was placed into the test facilities by employees of the manufacture on the 16th of April, 2014.

The test sample was tightened into the previously prepared sub construction on site.

The test construction was build as type E according to the appendix B.4 of the DIN EN ISO 354.

The tested construction was as follows (from top down):

- stretch ceiling CLIPSO® Type „495 D“, white
area density approx. 225 g/m²
mounted on aluminium profile CTA 50 by fastening profile
Clipso® P-DK27
- 5 mm airspace
- 50 mm polyester tissue Co. Techmed, Type LA54, approx. 1000 g/m²
- floor of the reverberation room
- 55 mm overall construction height

The joints between the aluminium profile CTA 50 and floor of the reverberation room were sealed air-tight.

The stretch ceiling with a size of 3500 mm x 3000 mm was fixed to the aluminium profile CTA 50 by fastening profile P-DK27.

The test area had a size of 10.50 m².

The photos in the appendix B show construction details.

3. Measurement Procedure

The measurements were conducted and evaluated in accordance with DIN EN ISO 354: 2003 "Measurement of sound absorption in a reverberation room ". The measurements took place on the 16th of April 2014 in the reverberation room of the company BAE Fiedler in Wächtersbach. The reverberation room has a volume of 204.6 m³. The floor area has a size of 46.6 m². The total room surfaces area is 209.3 m².

A total of 12 measurements with six microphone positions and two loudspeaker positions were conducted.

In order to improve the diffusion seven curved diffusers with a size between 1.25 m² and 3.1 m² are hung irregular in the room. The overall area size of the diffusers is approx. 19.38 m².

Pink noise was used as a test signal.

The climatic conditions during the measurements are included in the test certificate, appendix A.

The reverberation times with and without the sample are presented in appendix C.

The measurement devices used for the measurements are listed in appendix D.

4. Test Results

The test results are shown in the test certificates in appendix A.

In addition to the one-third-octave band sound absorption coefficients α_s the practical sound absorption coefficient α_p in one-octave bands is specified.

The calculation of the single number value, the weighted sound absorption coefficient α_w , is based on the practical sound absorption coefficient α_p of the one octave bands from 250 Hz to 4000 Hz.

The practical and weighted sound absorption coefficient were calculated in accordance with DIN EN ISO 11654:1997 "Sound absorbers for use in buildings -- Rating of sound absorption ".

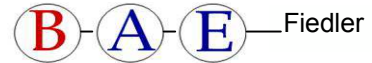
5. Final remark

This test report may only be copied, shown or published in its entirety, including all appendixes. The publishing of parts requires the approval in writing by BAE Fiedler.

A handwritten signature in black ink, appearing to read 'B. Fiedler'.

Dipl.-Ing. (FH) Bernd Fiedler
Consulting Engineer

sound absorption coefficient according to ISO 354:2003



Measurement of sound absorption in a reverberation room

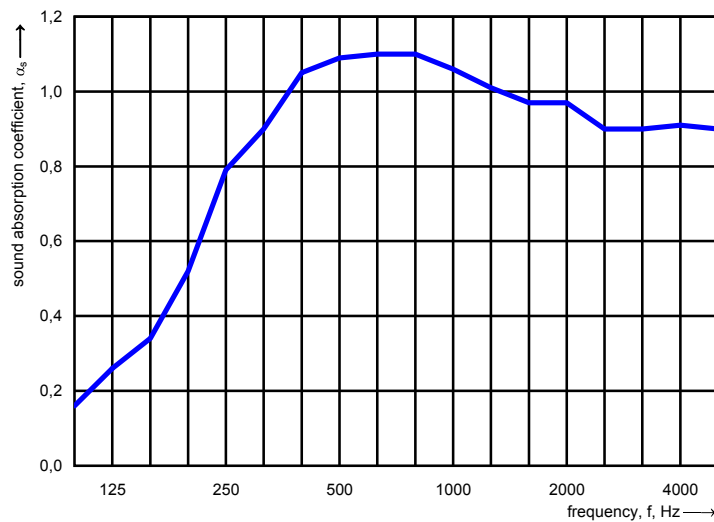
Büro für Akustik & Engineering

client: CLISPO Productions S.A.S. date of test: 16.04.2014
 mounting: From top down:
 Fabric, Co. CLIPSO, Type 495 D white, size 3500 mm x 3000 mm, test area 10.50 m², mounted on tenter frame
 55 mm air space, absorbent with polyester tissue LA54, d ~ 50 mm
 Aluminium frame with h = 55 mm, sealed joints between aluminium frame and floor of the reverberation room
 Floor of the reverberation room
 Overall construction height: 55 mm

object: Fabric, Co. CLIPSO, Type 495 D white, area density approx. 225 g/m²
 with absorbent 50 mm polyester tissue, Co. Techmed, Type LA54, 1000 g/m²

surface area:	10,50 m ²	room empty:	humidity	42,0 %	room with testing material:	humidity:	41,0 %
volume of room:	204,6 m ³	temperature:	18,7 °C	temperature:	18,7 °C	air pressure:	103,3 kPa
		air pressure:	103,3 kPa	air pressure:	103,3 kPa		

frequency f [Hz]	α_s
100	0,16
125	0,26
160	0,34
200	0,52
250	0,79
315	0,90
400	1,05
500	1,09
630	1,10
800	1,10
1000	1,06
1250	1,01
1600	0,97
2000	0,97
2500	0,90
3150	0,90
4000	0,91
5000	0,90



Name of test institute: BAE Fiedler - Büro für Akustik und Engineering, 35633 Lahnau

Dokument No. : BAE 14-321-01

Appendix A01

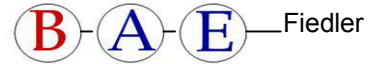
Date: 23.04.2014

B. Fiedler

signature Dipl.-Ing. (FH) Bernd Fiedler



sound absorption coefficient according to ISO 11654



Measurement of sound absorption in a reverberation room

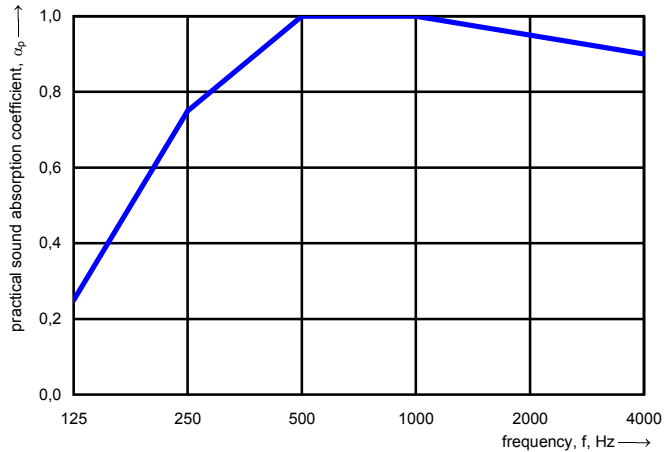
Büro für Akustik & Engineering

client: CLISPO Productions S.A.S. date of test: 16.04.2014
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 Aluminium frame with h = 55 mm, sealed joints between aluminium frame and floor of the reverberation room
 Floor of the reverberation room
 Overall construction height: 55 mm

object: Fabric, Co. CLIPSO, Type 495 D white, area density approx. 225 g/m²
 with absorbent 50 mm polyester tissue, Co. Techmed, Type LA54, 1000 g/m²

humidity 42 %
 temperature: 18,7 °C
 surface area: 10,50 m²
 volume of room: 204,6 m³

frequency f [Hz]	α_p
125	0,25
250	0,75
500	1,00
1000	1,00
2000	0,95
4000	0,90



weighted sound absorption coefficient according to ISO 11654
 $\alpha_w = 1,00$
 absorber class A



Name of test institute: BAE Fiedler - Büro für Akustik und Engineering, 35633 Lahnau

Dokument No.: BAE 14-321-01

B. Fiedler

Appendix A02

Date: 23.04.2014

signature: Dipl.-Ing. (FH) Bernd Fiedler

Stretch Ceiling CLIPSO® Type „495 D“, white

Figure 1: Frame Construction with Fastening Profile and Absorbent Material



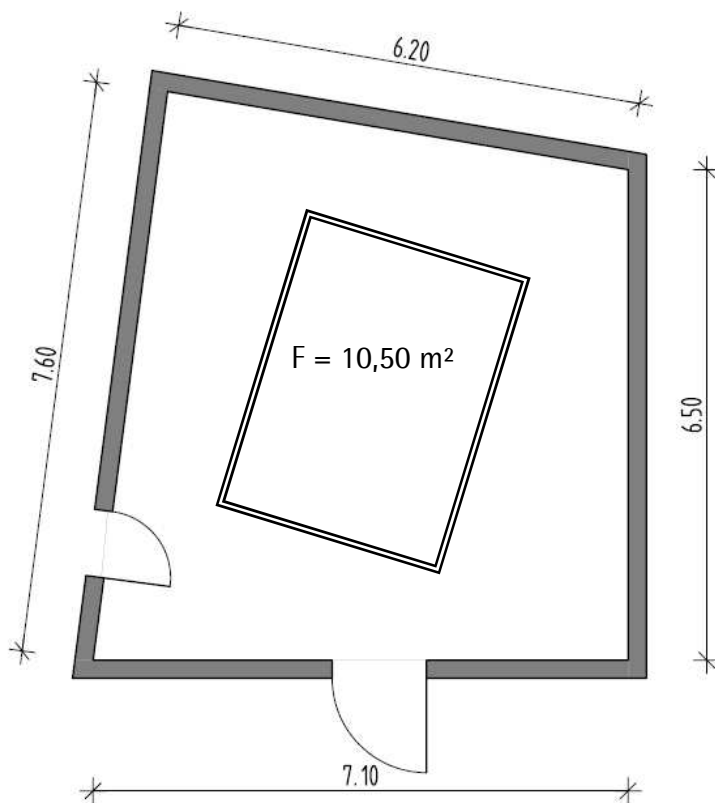
Figure 2: General View



Figure 3: Detailed View of the Surface



Figure 4: Schematic General View



Frequency [Hz]	T1 without sample	T2 with sample
	[s]	[s]
100	9,45	6,37
125	8,99	5,19
160	7,20	4,03
200	7,07	3,25
250	6,98	2,54
315	6,21	2,24
400	6,22	2,03
500	6,64	2,02
630	6,94	2,02
800	6,74	2,00
1000	6,41	2,03
1250	5,59	2,00
1600	5,00	1,96
2000	4,46	1,87
2500	3,83	1,82
3150	3,18	1,65
4000	2,51	1,44
5000	1,92	1,23

Measurement Devices

Device Function	Manufacture	Type	Serial No.
Sound Level Analyser	Norsonic	Typ 140	1403383
Microphone	Behringer	ECM 8000	0902332118
Microphone	Behringer	ECM 8000	0903089118
Microphone	Behringer	ECM 8000	0903083118
Microphone	Behringer	ECM 8000	0903086118
Microphone	Behringer	ECM 8000	0903079118
Microphone	Behringer	ECM 8000	0903084118
Zone Mixer	Behringer	ZMX 8210	
Amplifier	Crown	Type Xti 1000	8001517519
Dodecahedron	Norsonic	Type Nor229	35001
Software	Norsonic	Nor-Build	719