

LABORATORY MEASUREMENTS OF THE SOUND ABSORPTION OF CINEPLEXTONE

ASTM C423-01

Type E Mounting

Date of Test: 27/11/2009

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Test Number 4

Report Number – 1645

Table of Contents

1. Introduction.....	3
2. Methodology.....	4
3. Description of Test Specimen.....	6
4. Pictures of Test Specimen.....	8
5. Result Details.....	11
6. Conclusion.....	12
7. Schedule of Equipment Used.....	13
8. References.....	14

1. Introduction

Measurements of the Sound Absorption of the test sample *Cineplextone* were conducted at the Ventac Laboratory in accordance with ASTM C423-01. The test sample was mounted as per Type E mounting specified in ASTM E 756-05.

The measurements were performed on the 27/11/2009.

2. Methodology

The sound absorption coefficients of the test specimen were tested for under reverberant sound conditions in which a diffuse sound field is generated in a large chamber and upon stabilisation, the sound is abruptly stopped. The decay of the sound pressure level as it drops by 60dB is measured.

The test specimen was installed as a Type E mounting specified in E 795 – 5. There were no internal partitions in the internal air space of the mounted sample. A rigid level grid was used across the top of the mounting to support the sample. The edges of the sample were sealed to prevent air leaks. The chamber is designed to result in the generation of a diffuse sound field and has a volume of 283m³.

A steady sound source with a continuous spectrum in the frequency bands of interest is used to drive an omni-directional loudspeaker, which is located sequentially in two positions in the reverberation chamber. For each speaker position, 25 decay rate measurements are taken using five microphones positioned at various points throughout the reverberation chamber. Measurements are made at one third octave intervals from 100Hz to 5000Hz. The random incidence condenser microphones are located at a distance of greater than 1.5m from each other and at a distance greater than 0.75m from the sample.

Calculation Methodology

The Sound Absorption Coefficient (α) of the test specimen is calculated in each frequency band using the equation:

$$\alpha = (A_2 - A_1) / S$$

Where:

S is the area of the test specimen (m^2)

A₁ absorption of the empty reverberation room, m^2

A₂ absorption of the reverberation room after the specimen has been installed, m^2

And:

$$A = 0.9210 (Vd/c)$$

Where:

V is the volume of the reverberation chamber (m^3)

c is the speed of sound, m/s

d is the decay rate, dB/s

3. Description of Test Specimen

<u>Test Number:</u>	4
<u>Report Number:</u>	1645
<u>Method:</u>	C ASTM – 01
<u>Mounting:</u>	Type E (as per ASTM E795 – 05)
<u>Date:</u>	27/11/09
<u>Product Brand Name:</u>	Cineplextone
<u>Product Description:</u>	Acoustic Glasswool Ceiling Panel Faced with Toughskin and with Black Glass Tissue (BGT) overlapping at one side
<u>Dimension:</u>	603mm × 1212mm* (12pcs/ctn)

The test specimen and mounting was positioned on the floor of the reverberation chamber. The edges of the specimen were laid so as not to be parallel to the edges of the room.

*Eight full pieces were fitted to the test mounting and the remaining area was covered by sample pieces that were cut to fit the mounting.

Description of Test Specimen Mounting

- The sample was fitted to a *Type E* mounting.
- The sample was mounted on the floor of the reverberation room, which is a smooth, hard, rigid surface.
- The sample was 2.44m by 2.74 to give an area of 6.69m².
- The depth of the airspace underneath the sample was 400mm
- No part of the sample was closer than 1m to the edge of the room.
- The edge of the mounting was constructed using MDF timber boards.
- The edges between the sample panels and the edges between the sample panels and the mounting were sealed with tape.
- The sample was supported on a rigid steel grid.

4. Pictures of Test Specimen

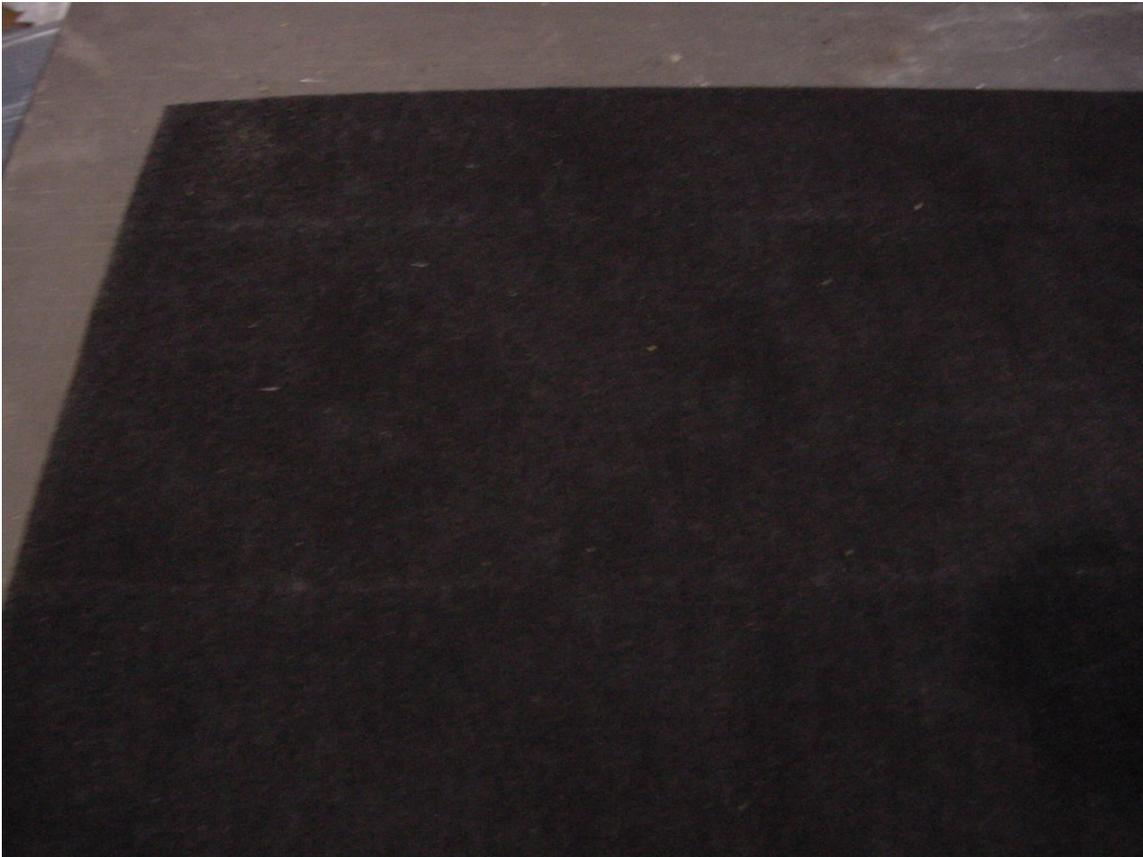


Figure 4.1: Close up of the Cineplextone material

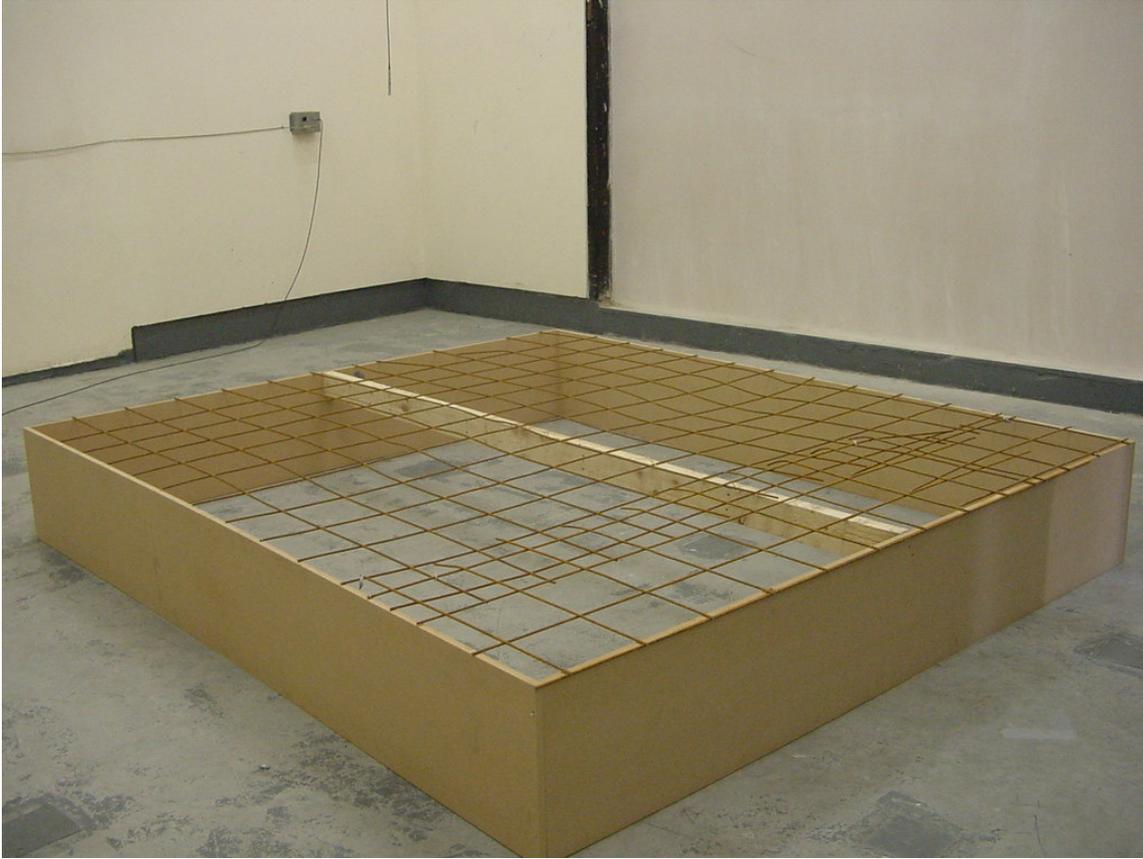


Figure 4.2: Type E Mounting



Figure 4.3: Test sample fitted to the Type E mounting.

5. Result Details

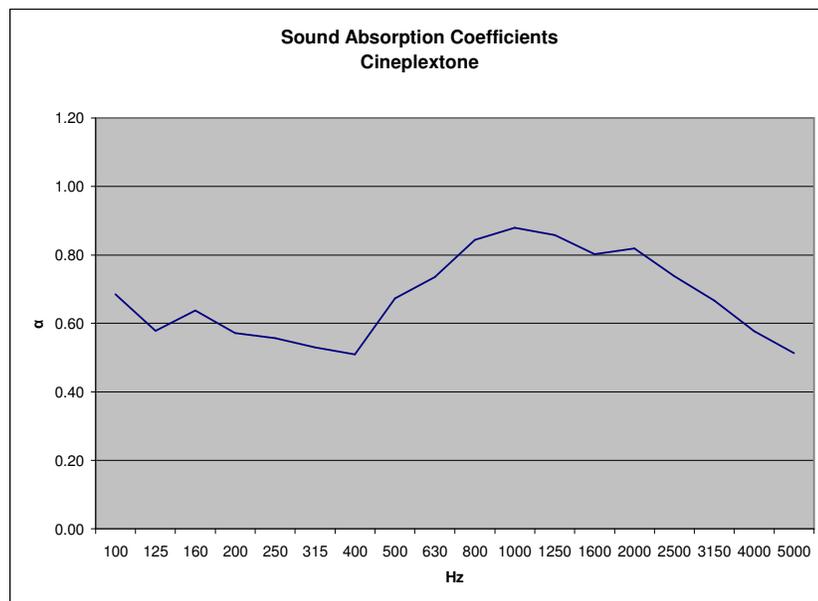
Sound Absorption measurements according to ASTM C 423 - 01

Test Number: 4

Report Number: 1645

Manufacturer: Polyglass	Test Date: 27/11/2009
Customer: Polyglass	Test room ID: Reverberation Chamber 1
Specimen mounted by: Ventac Group	Product Identification: Cineplextone
Volume of Reverberation Chamber (m³): 282.98	Product Description: Acoustic Glasswool Ceiling Panel Faced with Toughskin and with Black Glass Tissue (BGT) overlapping at one side
Specimen Area (m²): 6.69	Temperature of Test Chamber (°C): 10
Gap from Sample to Floor (mm): 400	Humidity of test rooms (%): 58%

Frequency	Sound Absorption Coefficients
Hz	α
100	0.68
125	0.58
160	0.64
200	0.57
250	0.56
315	0.53
400	0.51
500	0.67
630	0.74
800	0.84
1000	0.88
1250	0.86
1600	0.80
2000	0.82
2500	0.74
3150	0.67
4000	0.58
5000	0.51



SAA 0.71

Sound Absorption Average (SAA) calculated as per section 3.1.1 of the standard ASTM 423 - 01

NRC 0.70

Noise Reduction Coefficient (NRC) calculated as per section 3.2 of the standard ASTM 423 - 01

6. Conclusion

This report presents the results of measurements made to determine the Sound Absorption Coefficient at each of the one-third octave band test frequencies as per ASTM 423 - 01

7. Schedule of Equipment Used

- GRAS Microphone 40AR in conjunction with PreAmp 26AK
 - Serial Number Mic 1: 35770 / 21599
 - Serial Number Mic 2: 32828 / 21585
 - Serial Number Mic 3: 35771/ 33143
 - Serial Number Mic 4: 35764 / 21605
 - Serial Number Mic 5: 35769 / 21597

- 01dB Harmonie Multi Channel Analyser
 - Serial Number: 04299

- 01dB dBati49 Analysis Software

- InterM M-700 Power Amplifier
 - Serial Number: 010737842

- Norsonic Calibrator Type 1251
 - Serial Number: 20803

- 01dB - Stell Dodecahedron Speaker AVM DO12
 - Serial Number: 2069

8. References

1. ASTM C-423
Standard Test Method for Sound Absorption and Sound Absorption Coefficients
by the Reverberation Room Method
2. ASTM: E 795-05
Standard Practices for Mounting Test Specimens During Sound Absorption Tests