ALT
Acoustic Laboratory
Thailand

AIRBORNE SOUND

TRANSMISSION LOSS TESTING

Slimtech Co.,Ltd.

Felt Acoustic

Project No.: ALT3782408TM/002

26 August 2024

6/57 Poemsin Road Soi 42, Sai Mai, 10220 Bangkok, Thailand | T: (+66) 02-1296780 | e : info@altbkk.com

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LABORATORY TEST REPORT

AIRBORNE SOUND TRANSMISSION LOSS TESTING

OF

Slimtech Co.,Ltd.

Felt Acoustic

By

Acoustic Laboratory (Thailand) Co., Ltd.

Date of test: 8 August 2024

Date of issue: 26 August 2024

(Mr. Anusorn Whangphuklang)	(Mr. Pitupong Sarapho)	(Mr.Michel Rosmolen)
Laboratory Engineer Testing	Acoustic Engineer Reviewed	Lead Acoustic Engineer Approved

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Test Location: Acoustic Laboratory (Thailand) Co., Ltd.
6/57, Poemsin Road Soi 42, Sai Mai,
10220 Bangkok Thailand

Customer: Slimtech Co.,Ltd.
63 Moo4 Tambon Khlongsi Amphoe Khlongluang
Pathumthani 12120

Material: Felt Acoustic
2.4 m (W) X 2.4 m (H) X 0.105 m (Thickness)

Date of test: 8 August 2024

Scope of test: 1. Airborne sound transmission loss testing
in accordance with ASTM E90 standard
2. Single number rating result in accordance with ASTM E413

Measurement parameter: Sound Transmission Class (STC)

Standard test: ASTM E90

Test conditions:

Location	Temperature	Relative Humidity	Static pressure
Reverberation Room A (source room)	25.6 °C	56%	100.7 kPa
Reverberation Room B (receiving room)	25.6 °C	56%	100.7 kPa

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1. Introduction

The testing of the airborne sound transmission loss has been conducted at Acoustic Laboratory (Thailand) Co., Ltd. The purpose is to determine the sound transmission loss of the Felt Acoustic. The sound insulation measurements have been performed on 8 August 2024.

2. Objectives

To measure the sound transmission loss of the Felt Acoustic. The test room is located at the Acoustic Laboratory (Thailand) Co., Ltd. The measurements proceeded in accordance with the international standard of ASTM E90: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

3. Description of the test specimen

The test object is Felt Acoustic. The test specimen total thickness of 105 mm. Felt Acoustic with a thickness of 12 mm, Gypsum wall with a thickness of 9 mm, Polyester microfiber with a thickness of 50 mm, Flora Felt with a thickness of 25 mm and Gypsum wall with a thickness of 9 mm. Use silicone to seal edges of the gaps between the areas. The total dimensions of the test specimen are 2400 mm x 2400 mm, with a total surface area of 5.76 m^2.

The test object was constructed between two reverberation rooms of the Acoustic Laboratory Thailand. The layout of the reverberation rooms is in Appendix A section, and the construction drawing is illustrated in Appendix B.

4. Test Method

The test measurement of the airborne sound transmission loss was carried out in accordance with the ASTM E90: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements. The sound transmission loss is determined from the calculation of the averaged sound pressure levels in the two reverberation rooms, the area of the test specimen, and total sound absorption in the receiving room.

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5. Test facilities

The test rooms have separated construction bases and have no connection between the two buildings. test rooms have a completely separated foundation. Between the rooms is not any solid connection which allows us to measure accurately Rw values up to 70 dB.

Two reverberation rooms at the Acoustic Laboratory (Thailand) Co., Ltd. are used as a source room and receiving room for the test measurement. The Reverberation Room A was used as a source room with no surfaces parallel to each other. The Reverberation Room B was used as the receiving room is smaller. The test opening in which the test wall was constructed has a dimension of 2400mm x 2400mm the two test rooms have separated construction bases and have no joints between the two buildings. Therefore, the sound transmission via flanking transmission and other transmission paths rather than through the test wall is minimized.

6. Instrumentation and measuring equipment

Microphones and sound analyzers are used to measure average sound pressure levels in the source and receiving room. The equipment used for the test measurement is listed in table 1.

Table 1 Instrumentation and measuring equipment

Description	Manufacturer	Model
Sound level meter	Norsonic	Nor145
Sound level meter	Norsonic	Nor150
Sound calibrator	Norsonic	Nor1256
Omni-directional sound source	Norsonic	Nor276+Nor282

The measuring instruments used for the test measurements are in accordance with the latest revision of the following National and International standards including amendments, all type 1/class 1; IEC 61672, IEC 61260, DIN 45657, ANSI S1.4, ANSIS1.11, and ANSI S1.43. The instrument also conforms to the obsolete sound level meter standards IEC 60651 and IEC 60804.

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The transmission loss measurement frequency range starts from 100 Hz to 5 kHz. The test signal was emitted through the Omni-directional sound source, using pink noise, and was set at its maximum possible level.

7. Test procedure

Before starting the measurement, the sound level meters were calibrated using the sound calibrator Nor1256 with a reference signal at 1kHz, 114 dB. The microphones of the sound level meters were installed with windshields to prevent faults resulting from the surrounding airflow or dust and were pointing toward the ceiling.

1) The sound level meter Nor145 was placed in the Reverberation Room A (source room), while the Nor150 was placed in the Reverberation Room B (receiving room).
2) The Omni-directional sound source was placed in the Reverberation Room A (source room).
3) The background noise level in the Reverberation Room B (receiving room) was measured with no test signal from the sound source.
4) The sound source was set to the maximum possible gain level, generating the pink noise as the test signal.
5) The average sound pressure levels in the source and receiving room were measured. The average time is 15 seconds. The measurement was carried out at six positions for each source location (12 measurements in total) in each room. The microphone positions were chosen in accordance with the requirements of the minimum separation between the microphone to the microphone and between the microphone to the test surface. The final space and time average sound pressure level is calculated as L_S (average sound pressure level in the source room) and L_R (average sound pressure level in the receiving room).
6) The sound absorption of the Reverberation Room B (receiving room) is derived from the measured sound decay time T30.

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7) The sound transmission loss at each frequency was calculated using the equation according to the ASTM E90 calculation method.

$$TL = L_S - L_R + 10\log\frac{S}{A}$$

where:

TL = transmission loss, dB

L_S = average sound pressure level in the source room, dB

L_R = average sound pressure level in the receiving room, dB

S = area of test specimen that is exposed in the receiving room, m²

A = sound absorption of the receiving room with the test specimen in place, m²

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8. Result

The transmission loss at each frequency band starting from 100 Hz to 5000 Hz, presented in one-third octave bands is shown in table 2. The transmission loss results at mid-frequencies, from 125Hz to 4000 Hz are used to calculate the single number rating of **Sound Transmission Class (STC)**, with the method of the ASTM E413-Classification for Rating Sound Insulation. The rating graph for the single number rating is displayed in figure 1.

Table 2 *Sound Transmission Loss results*

Frequency [Hz]	Transmission Loss [dB]
100	15.0
125	22.0
160	24.0
200	28.0
250	33.0
315	37.0
400	41.0
500	47.0
630	52.0
800	56.0
1000	59.0
1250	62.0
1600	66.0
2000	68.0
2500	69.0
3150	70.0
4000	63.0
5000	65.0
STC	**44**

Sum of deviations:	28	dB		
Max. deviation:	7.0	dB	at	160 kHz

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Figure 1 *Rating graph of the Sound Transmission Class in accordance with the ASTM E413*

Sound transmission loss

ASTM E90 - 16 / ASTM E413 - 16

Client: Slimtech Co.,Ltd.
Date of test: 8 August 2024
Description: Laboratory Testing of Airborne Sound Transmission Loss

Felt Acoustic

Object: The test object is Felt Acoustic. The test specimen total thickness of 105 mm. Felt Acoustic with a thickness of 12 mm, Gypsum wall with a thickness of 9 mm, Polyester microfiber with a thickness of 50 mm, Flora Felt with a thickness of 25 mm and Gypsum wall with a thickness of 9 mm. Use silicone to seal edges of the gaps between the areas. The total dimensions of the test specimen are 2400 mm x 2400 mm, with a total surface area of 5.76 m^2.

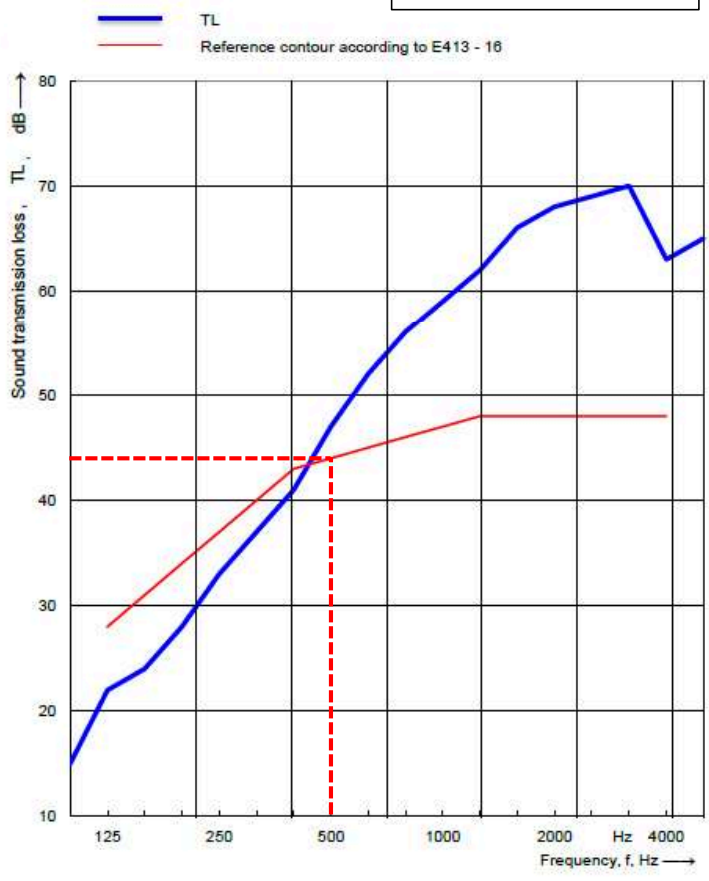
Picture of test object



Temperature: 24.6 °C
Humidity: 56.0 %

Size of test element: 5.76 m²

Frequency f [Hz]	TL 1/3 octave [dB]
100	15.0
125	22.0
160	24.0
200	28.0
250	33.0
315	37.0
400	41.0
500	47.0
630	52.0
800	56.0
1000	59.0
1250	62.0
1600	66.0
2000	68.0
2500	69.0
3150	70.0
4000	63.0
5000	65.0



Sound transmission class **STC = 44 dB**

Name of test institute: Acoustic Laboratory (Thailand) Co., Ltd.
No. of test report: ALT3782408TM

Date: 8 August 2024 Signature:

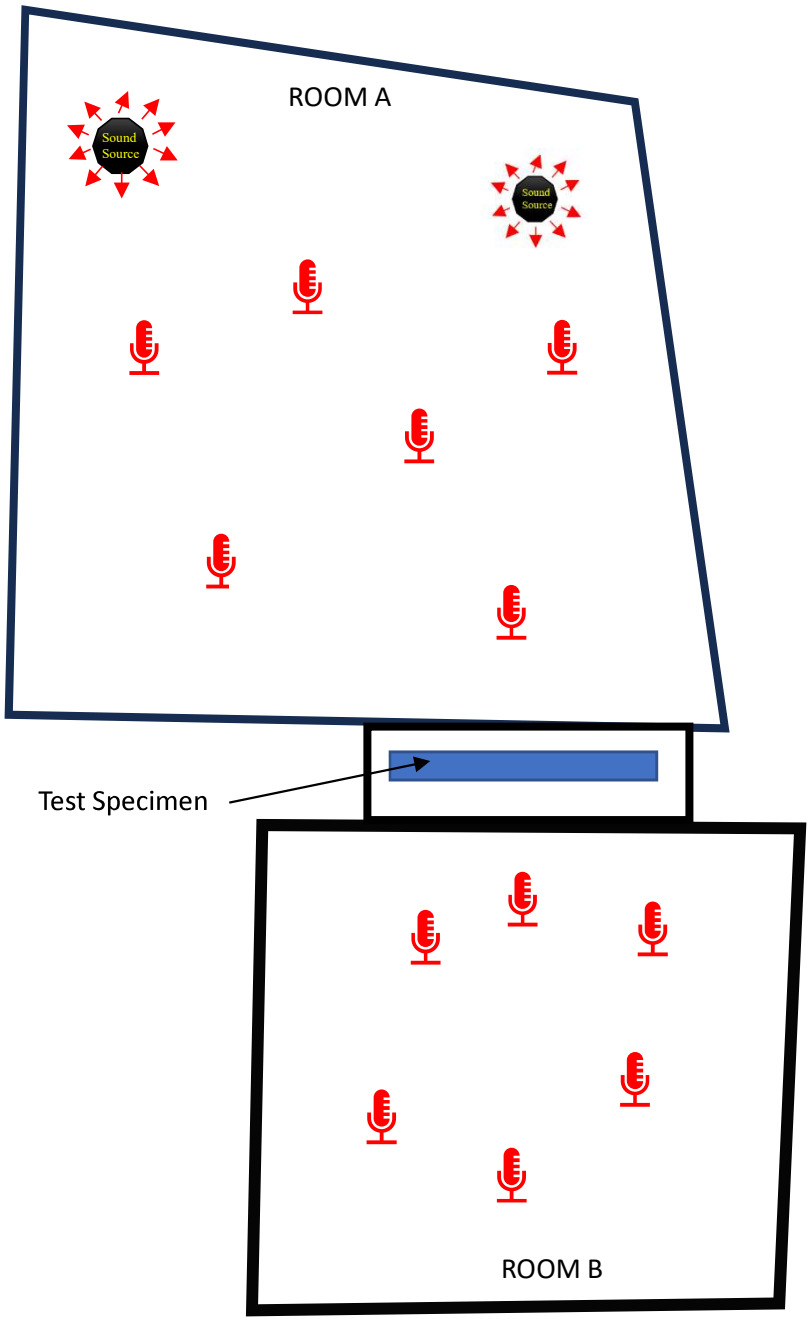
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Appendix A

Reverberation Rooms Layout



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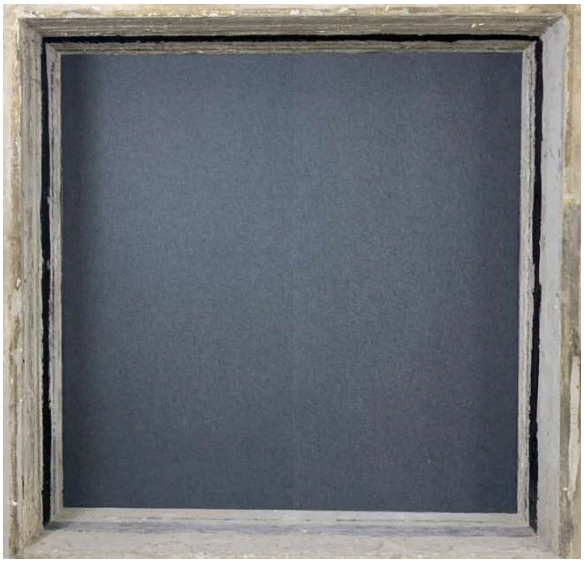
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Appendix B

Picture of the test object

Room A



Room B



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