



**LABORATORY REPORT
ON
AIRBORNE SOUND TRANSMISSION-LOSS MEASUREMENT
OF
THE GYPSUM BOARD - SANDWICH PANEL
WITH DOOR SET
FOR
SUPA RICH CO., LTD.
THAILAND.**

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1. Subject:

Laboratory measurement of the airborne sound transmission loss (TL) of the fire resistance Gypsum board and sandwich panel with door set submitted by SUPA RICH Co., Ltd. on 23 November 2022.

2. Client:

SUPA RICH Co., Ltd.
27 Ramintra Soi 48, Ramintra Road,
Ramintra, Khannayao,
Bangkok 10230
Thailand.

3. Description of the Specimen:

The specimen is constructed from *FireBloc* fire resistance Gypsum board (15 mm. of thickness) and the *RICCO* sandwich panel (100 mm. thickness) with a door set (model *SAC 01 C42*). The test wall detail is shown in Figure 2. The door dimension is 1010 mm x 2110 mm x 63.5 mm. The fully operable door set was installed to the 3.04 m x 2.44 m test wall.

The specimens were installed between two reverberation chambers, as illustrated in Figure 3.

4. Test Date:

23 November 2022.

5. Test Method:

To determine the airborne sound transmission loss (TL), the specimen was installed between two reverberation chambers (see Figure 3). The space- and time-averaged sound pressure levels in the two rooms are determined. In addition, with the test specimen in place, the sound absorption in the receiving room is determined. The sound pressure levels in the two rooms, the sound absorption in the receiving room and the area of the specimen are used to calculate transmission loss (TL) value. And the Sound transmission class (STC) is determined.

6. Measurement Facilities:

The measurement was performed in a double-reverberation chamber, with a background noise less than 30 dBA, at the Acoustics Laboratory, Department of Physics, Faculty of Science, Chulalongkorn University, Bangkok, Thailand.

The instruments used for the measurements are as follow:

- a) Random-field Condenser Microphones (G.R.A.S. model 40AR).
- b) Microphone Pre-amplifier (01dB model Pre 21).
- c) Computer-based Acoustics Analyzer (01dB model Symphonies).
- d) Building Acoustics Software (01dB Model dBBATI).
- e) Sound level calibrator (01dB Cal21).
- f) Power amplifier (QSC model PLX1804).
- g) Loudspeaker Unit (Brüel & Kjær model 4224).



7. Measurement Procedures:

Before the transmission-loss measurement, the microphone calibration was done and the background noise was measured. Then, the pink noise was sent to the loudspeaker unit, which placed in the source room. There are two microphones used in this measurement. One was installed in the source room to record the incident sound pressure level on the specimen before transmit through the material. Another microphone was placed in the receiving room to measure the transmitted sound pressure level and the reverberation time of the receiving room.

All spectra were recorded and by cause 7.3.1 of the ASTM E 90-02 the transmission loss (TL) values were calculated at each frequency in the 1/3-octave band. The center frequencies in this measurement are at 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1kHz, 1.25kHz, 1.6kHz, 2kHz, 2.5kHz, 3.15kHz and 4kHz respectively.

Finally, the single value rating, Sound Transmission Class (STC) according to ASTM E 413 was calculated from the sound transmission loss.

8. Result:

The airborne sound transmission-loss (TL) of the test sample for each individual 1/3 octave band center frequency and the STC rating number of the test wall were tabulated in **Table 1**. The graphical representation of the values in the table 1 was shown in **figure 1**.

However, these TL-values and the STC rating in this measurement are valid only in this test condition. Thus, the internal structure of the wall, the installation and the size of the specimen can give the influences to the transmission-loss measurements.

9. This report is issued under the following conditions:

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Table 1. The airborne sound transmission-loss (TL) for each individual 1/3 octave band center frequency and STC rating of test sample.

Test panel: *RICCO* sandwich panel (100 mm. thickness) and *FireBloc* Gypsum board (15 mm. thickness) with *SAC 01 C42* door set.

Client: SUPA RICH Co., Ltd.

Test sample size: 3040mm. x 2440mm.

Date of test: 23 November 2022.

Temperature: 27°c

Relative humidity: 50%

Frequency (Hz)	TL (dB)
125	27
160	25
200	29
250	31
315	34
400	38
500	42
630	45
800	49
1000	50
1250	51
1600	47
2000	45
2500	45
3150	49
4000	53

STC	43
Maximum Deficiency	5 dB
Sum of Deficiency	28 dB



Figure 1. The airborne sound transmission-loss (TL) and the STC rating of the test sample.

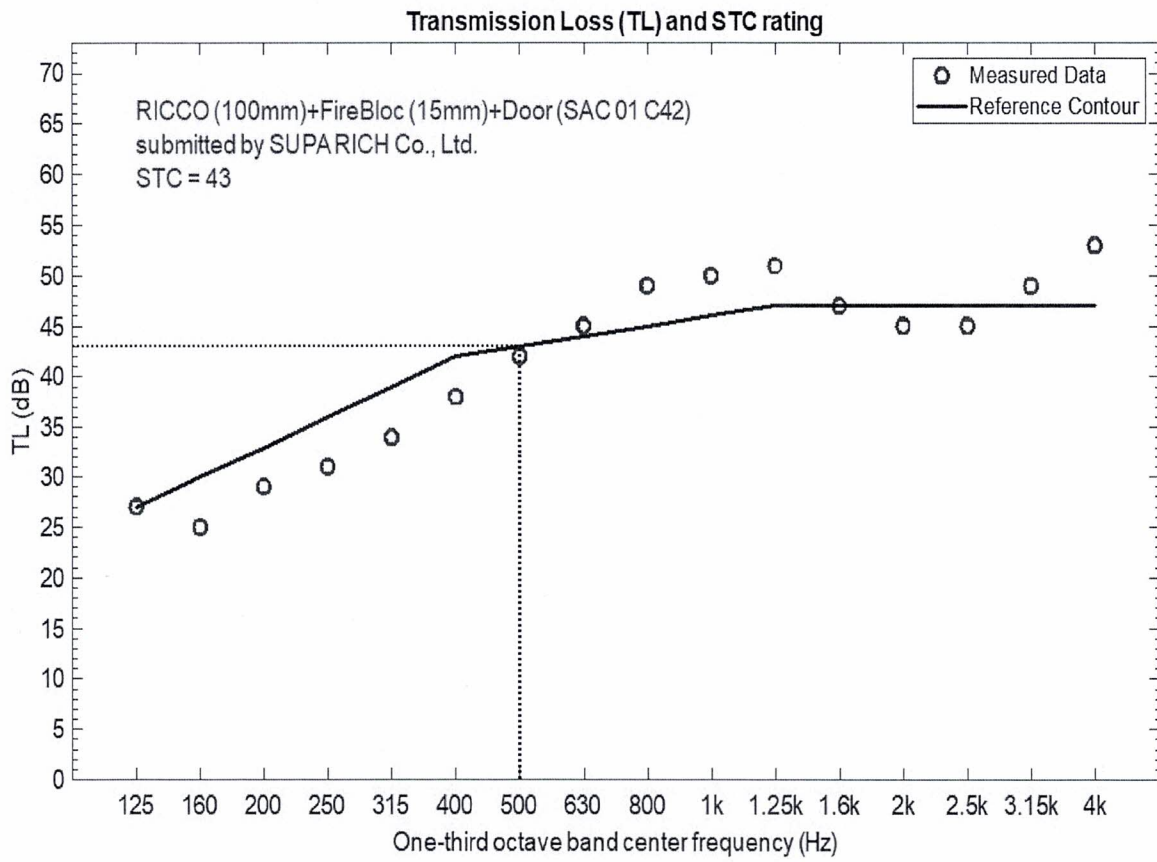


Figure 3. Schematic drawing of the measurement set-up in a double-reverberation chamber.

