LABORATORY REPORT
ON

AIRBORNE SOUND TRANSMISSION-LOSS MEASUREMENT
OF

THE SANDWICH PANEL
FOR

SUPA RICH CO., LTD.
THAILAND.

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1. Subject:

Laboratory measurement of the airborne sound transmission loss (TL) of the sandwich panel submitted by SUPA RICH Co., Ltd. on 14 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 test sample is ***RICCO*** sandwich panel with 100 mm. of thickness. The panel surface is 0.65 mm thick electro galvanized steel. The panel core is Rockwool with density of 125 kg/m^3 as shown in Figure 2. The test panel size is 3.04 m. x 2.44 m.

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

4. Test Date:

14 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:

This report applies to the sample of the specific product given at the time of its testing. The results are not used to indicate or imply that they are applicable to other similar items. In addition, such results must not be used to indicate or imply that Chulalongkorn University approves, recommends or endorses the manufacturer, supplier or user of such product, or that Chulalongkorn University in any way "guarantees" the later performance of the product.

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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 the test sample.

Test panel: ***RICCO*** sandwich panel (100 mm. of thickness).
Client: SUPA RICH Co., Ltd.
Test sample size: 3040mm. x 2440mm. x 100mm.
Date of test: 14 November 2022.
Temperature: 27°c
Relative humidity: 50%

Frequency (Hz)	TL (dB)
125	30
160	28
200	24
250	28
315	24
400	22
500	16
630	24
800	29
1000	27
1250	32
1600	38
2000	42
2500	48
3150	53
4000	56

STC	24
Maximum Deficiency	8 dB
Sum of Deficiency	10 dB

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

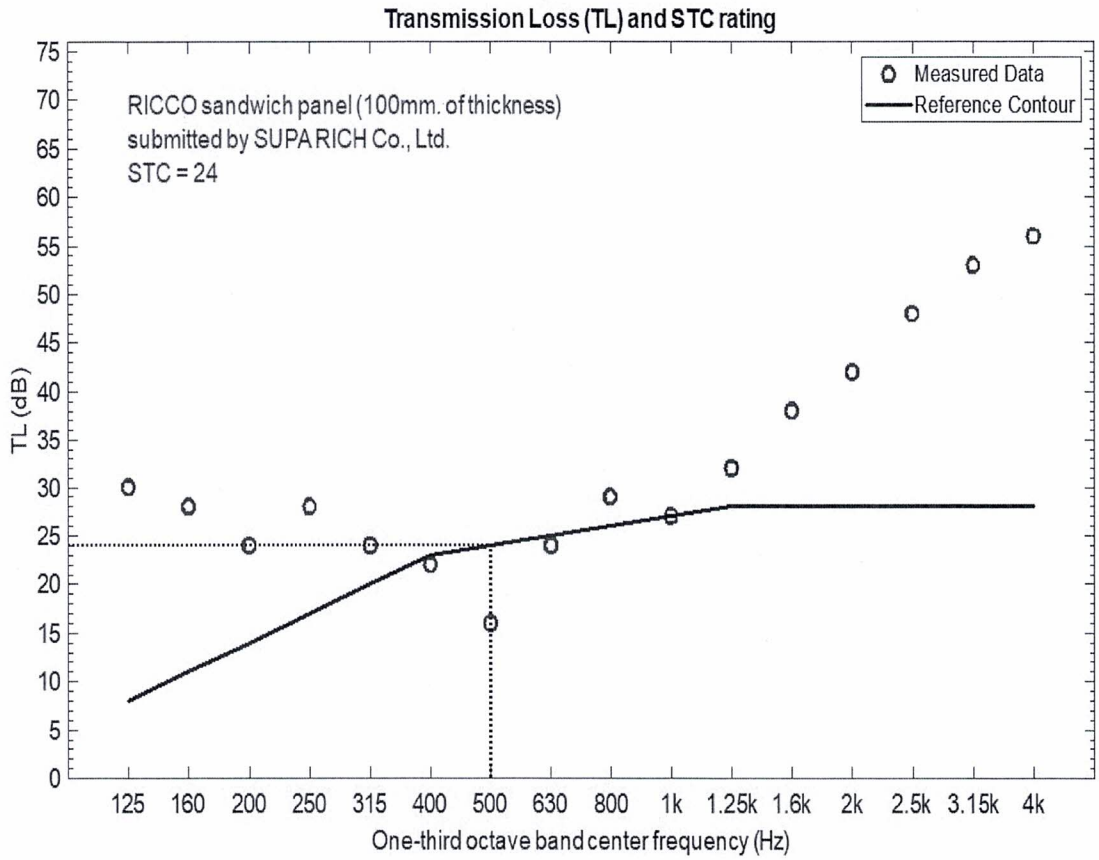

Figure 2. Specification of the test sample.

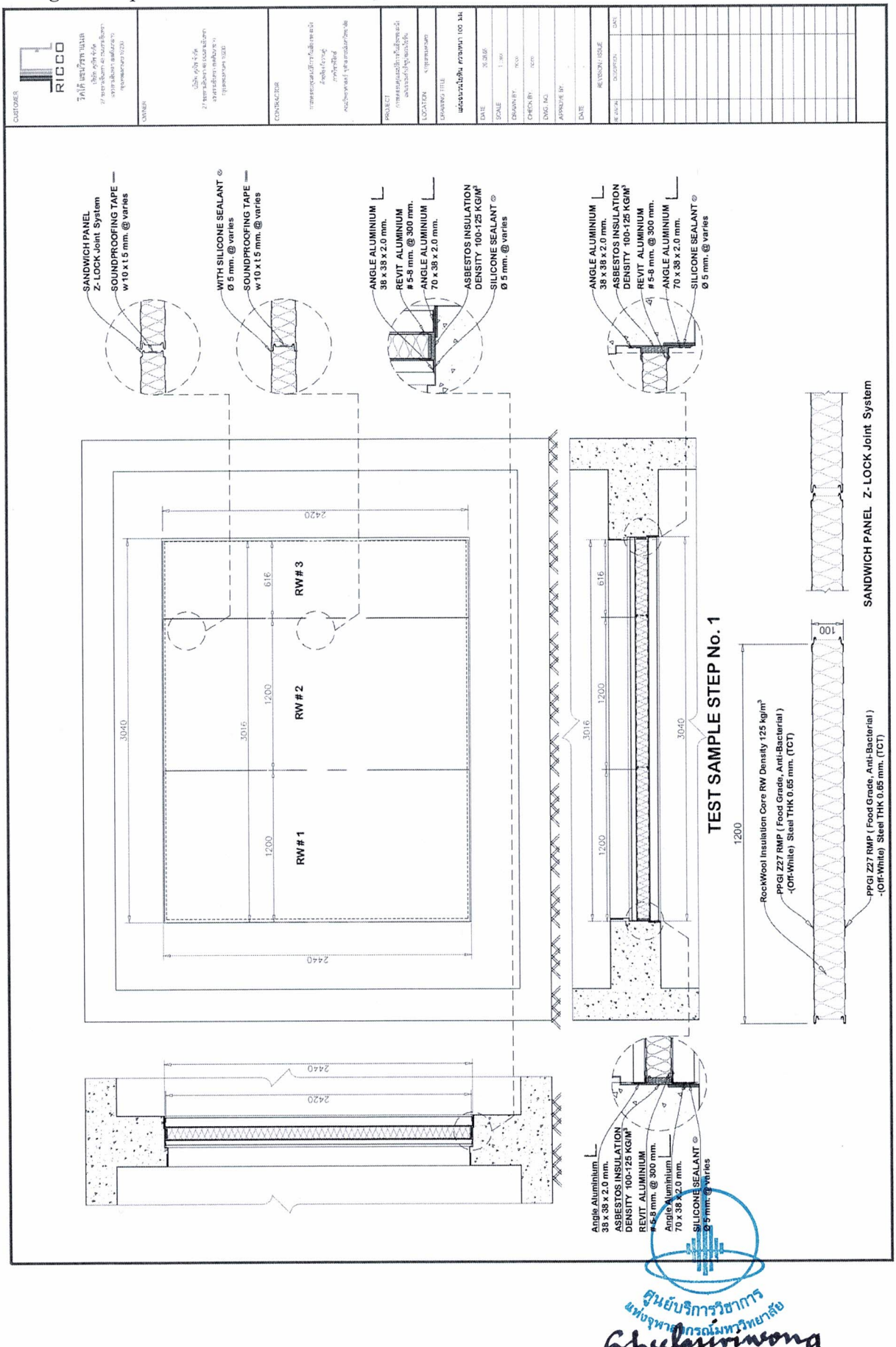

Figure 3. Schematic drawing of the measurement set-up in a double-reverberation chamber.