SOUND ABSORPTION OF POLYTONE 200/800 GLASSWOOL (DENSITY = 60kg/m^3) CEILING PANEL MANUFACTURED BY POLY GLASS FIBRE (M) BHD ON TYPE-E MOUNTING.

FOR

Poly Glass Fibre (M) Bhd.
2449, Lorong Perusahaan Sepuluh
Kawasan Perusahaan Perai,
13600 Perai, West Malaysia

TEST CONDUCTED BY

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Dept. of Mechanical and Production Engineering
National University of Singapore.

April 2002

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Test Date: 13th April 2002

1.0 DESCRIPTION OF TEST SPECIMEN:

Product Brand Name: Polytone
The specimen tested consists of 12 pieces of 15 mm thick glasswool ceiling panel each with a density of 60kg/m^3. A layer of 0.07mm thick PVC Vinyl is pasted onto the front of the panel.

The specimen was tested in Type E mounting as specified in ASTM E795-93: Standard Practices for Mounting Test Specimens During Sound Absorption Tests.

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2.0 METHOD OF MEASUREMENT

2.1 Test Standard

The test was conducted in compliance with ASTM-C423-90a: Standard Test Method for Sound Absorption and Sound Absorption Coefficient by the Reverberation Room Method.

2.2 The Instruments Used For the Measurements

a) Loudspeaker unit, (B&K 4224)
b) Acoustics analyser (B&K 2133)
c) 1/2" condenser microphones (B&K 4165)
d) Microphone preamplifiers (B&K 2619)

2.3 Test Facility

The test was carried out in the reverberation room inside the Acoustics laboratory. The plan of the room is shown in Appendix A. The total volume of the room is 229.6 cu.m. with a surface area of 227.8 sq. m. Wooden panels of various sizes were positioned inside the room to act as sound diffusers.

The test specimen with a total area of 8.77 m^2 was laid in a balanced position on the floor as shown in Appendix B.

The sound source was a loudspeaker with a built-in amplifier. It was positioned at 1 m away from one corner of the room. Generation of sound and analysis of the rate of decay of the sound pressure level was done by the B&K analyser (model 2133).

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2.4 Test Procedure

Measurements were conducted in accordance with the American Society for Testing and Materials ASTM C423-90a: Standard Test Method for Sound Absorption and Sound Absorption Coefficient by the Reverberation Room Method.

A brief account of the measurement procedure is given as follows

a) Instrumentation set up in accordance to the requirements laid down by ASTM-C423.

b) Sound source system was switched on and maintained at constant level in the reverberation chamber. Plan of the reverberation chamber is in Appendix B.

c) Reverberation time at each third-octave band starting from 100 Hz was measured at nine positions in the reverberation chamber without the ceiling system. Three readings were taken at each position and averaged.

d) For Type E mounting, the glasswool ceiling panels were placed slightly off-centre on the 40 cm deep plenum as shown in Appendix B.

e) Measurement of the reverberation time at each third-octave band starting from 100 Hz was repeated at the same nine positions with the ceiling system installed within the chamber. Number of readings at each position is again three.

2.5 Test conditions

During test:

Area of sample = 8.77 m^2.
RH = 83 ± 3 %
Temperature = 28 ± 2 °C.
Nominal thickness for the sample = 15 mm.
Noise source : broad-spectrum white noise about 91 dBL

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3.0 RESULTS

Absorption coefficient for the glasswool ceiling panel on Type E mounting are calculated according to ASTM C423-90a.

Computed "Sound Absorption Coefficient" with 95% confidence in the uncertainty for both types of mounting are tabulated below as table I.

Table I

Octave Band Frequency Hz	Sound Absorption Coefficient on Type-E mounting Polytone
100	0.42 ± 0.04
125	0.52 ± 0.04
160	0.53 ± 0.04
200	0.52 ± 0.03
250	0.41 ± 0.02
315	0.38 ± 0.01
400	0.40 ± 0.02
500	0.40 ± 0.02
630	0.48 ± 0.02
800	0.54 ± 0.02
1000	0.77 ± 0.02
1250	0.84 ± 0.02
1600	0.76 ± 0.03
2000	0.74 ± 0.02
2500	0.69 ± 0.03
3150	0.66 ± 0.02
4000	0.65 ± 0.02
NRC	**0.62**

Bold faced values are those used in computing NRC value.

These results are plotted as Fig. 1.

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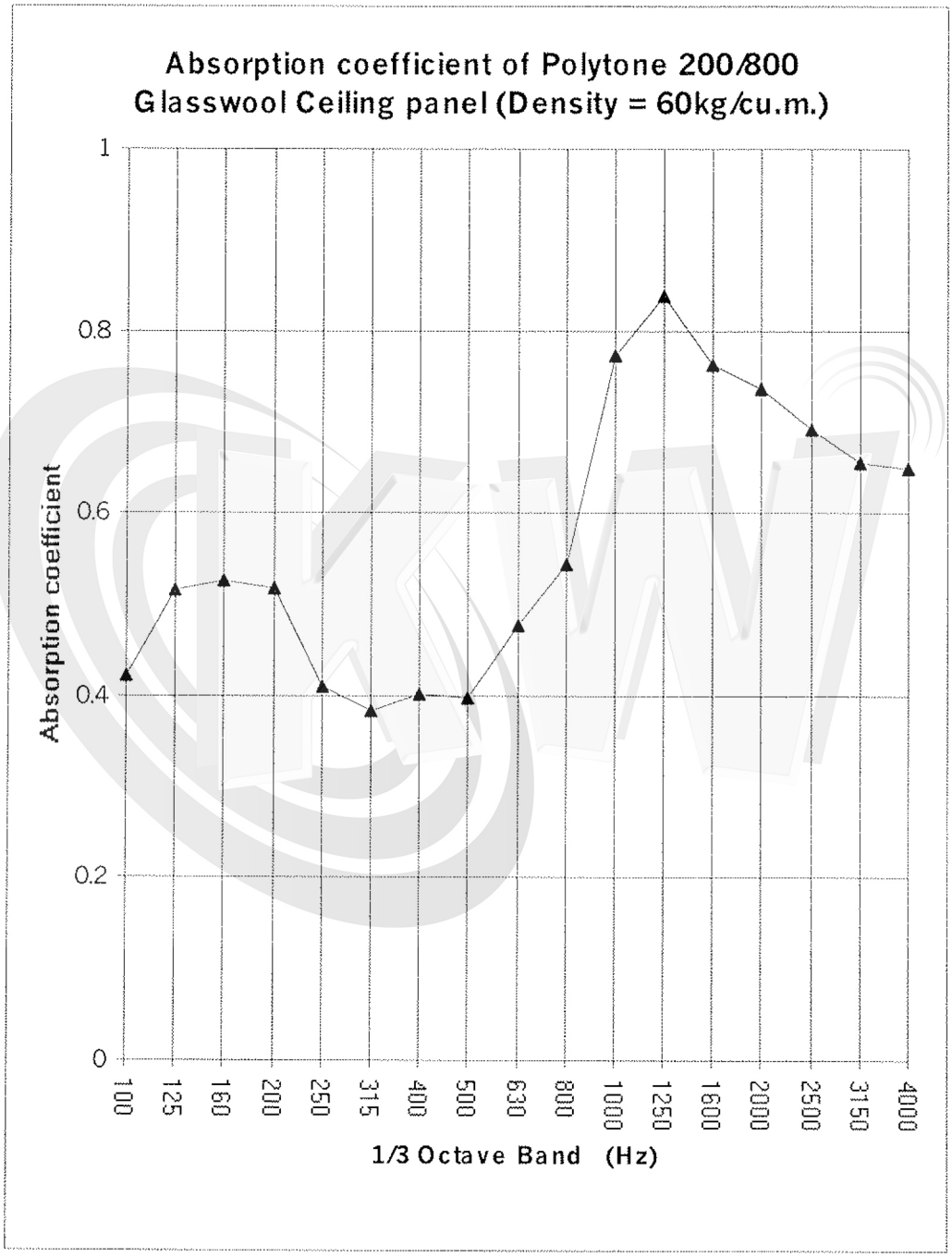

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4.0 DISCUSSIONS

The PVC Vinyl layer is not porous to sound wave and it is not freely floating above the glasswool. This compromises the performance of the panels.

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APPENDIX A

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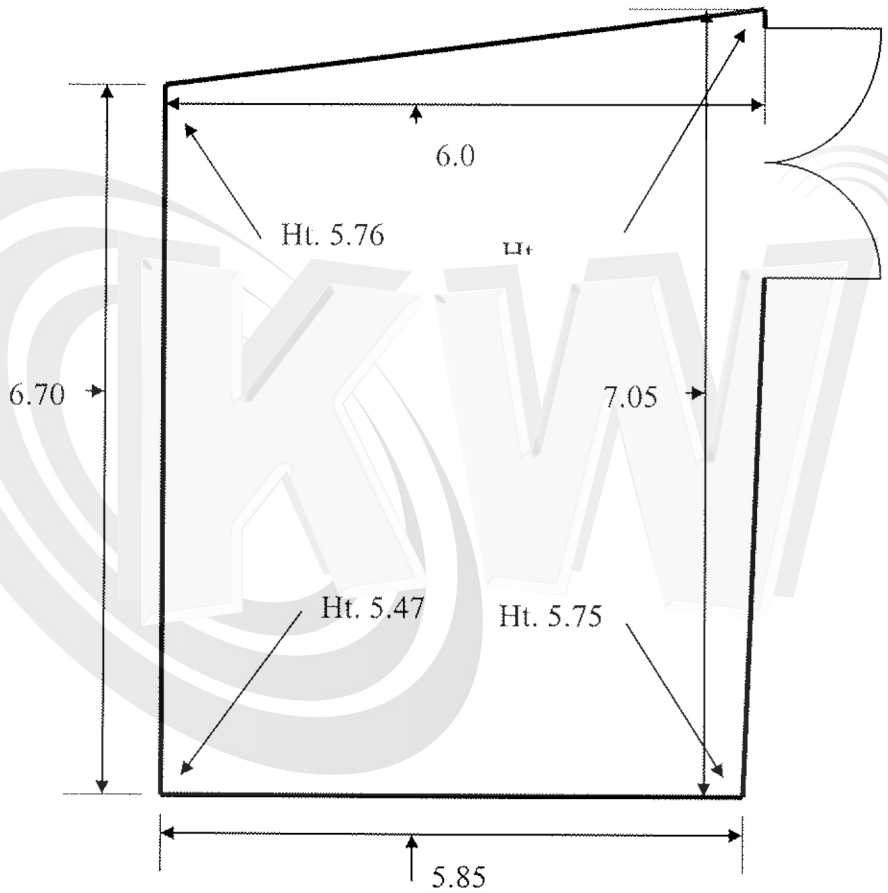

All dimensions are in metre
Not to scale

REVERBERATION CHAMBER

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APPENDIX B

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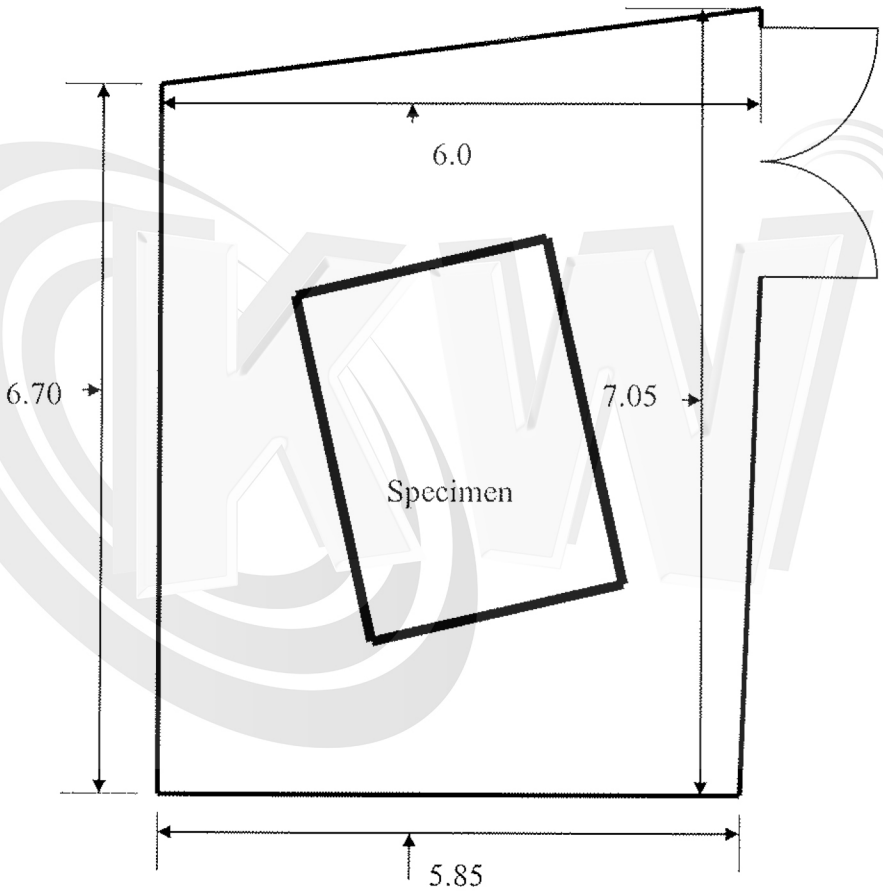

Not to scale

POSITION OF THE SPECIMEN IN THE REVERBERATION CHAMBER

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