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CSIRO

LABORATORY MEASUREMENT

OF

AIRBORNE SOUND TRANSMISSION LOSS

MEASUREMENT NO: TL399

DATE OF MEASUREMENT: 19 July, 2001

COMMISSIONED BY: Quik'nTuff Manufacturing Ltd
PO Box 27,
Wilston,
Queensland, 4051.

SUMMARY

The sound transmission loss (*TL*) of a timber stud wall system lined with a proprietary concrete composite material on one face and plasterboard on the other, has been determined.

The measurement was performed in compliance with the requirements of AS 1191-1985 "*Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions*".

The Sound Transmission Class (*STC*) and the Weighted Sound Reduction Index (R_w) of the wall were calculated using the procedures respectively specified by AS 1276-1979 and AS/NZS 1276.1:1999.

DESCRIPTION OF SPECIMEN

The specimen tested consisted of a 90mm timber stud frame at 600mm centres. On one side was a proprietary 51mm thick concrete composite material, with an approximate density of 13kg/m^2, which was manufactured by Quik'nTuff™ Wall Systems. This material was supplied as sheets (measuring 900 x 2230mm), which were installed horizontally utilising a 30mm airgap and affixed using QT™ Lock Brackets. All joints were taped and grouted. A 4mm thickness of acrylic render was then applied to the exterior surface. On the other side 10mm thick plasterboard sheeting was direct fixed to the timber studs.

A technical drawing, supplied by Quik'nTuff™ Wall Systems, showing the construction detail is attached to this report.

METHOD OF TEST

(a) Specific

The measurement was performed to comply with the requirements of AS 1191-1985 "Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions".

(b) General

The specimen was assembled into an 11.9 m^2 aperture provided in the common wall between a pair of purpose-built reverberation rooms. A steady level of broadband random-noise was generated in one of the rooms, and the resulting sound pressure levels (100 Hz to 5 kHz) were measured in both rooms. The differences between the sound pressure levels in the rooms were converted to transmission loss values by correcting for the sound absorption characteristics of the receiving room.

DESCRIPTION OF TEST FACILITY

The transmission rooms in which the tests were conducted have been designed and built to be structurally independent from one another. This was done to minimise any structure-borne noise, induced by test signals, from outflanking sound passing through test specimens mounted in the aperture within the common wall. The common wall between the rooms consists of two parallel concrete walls (each 305 mm thick) separated by a 50 mm air gap. A steel-lined test-aperture (3.23 m high x 3.68 m wide x 0.51 m deep) has been built into the common wall. To stop the steel aperture from rigidly bridging across the gap between the rooms, a 6 mm cut has been made around its perimeter adjacent to the air gap.

To enhance diffusion of sound, both rooms have an irregular pentagonal floor plan and sloping ceilings, and they each contain randomly oriented diffusing plates. The "source" room (that in which the sound source was placed) has a volume of 203 m^3, and a total surface area of 261 m^2 . The "receiving" room has a volume of 204.4m^3, and a total surface area of 264.3 m^2. All external surfaces of the reverberation room pair are constructed of 305 mm thickness reinforced concrete, to exclude external noise.

TEST RESULTS

Table 3 presents the airborne transmission loss results. The final two rows in the table give the Sound Transmission Class (STC), the Weighted Sound Reduction Index (R_w) with the Spectral Adaption Terms (C; C_{tr}) as determined respectively by the Australian Standard AS 1276-1979, AS/NZS 1276.1:1999 and ISO-717.1-1996.

Table 3. Test results, STC and R_w ratings with Adaption Terms

Frequency, Hz	Specimen TL, dB
100	17.7
125	19.7
160	21.1
200	26.0
250	30.5
315	34.8
400	37.3
500	40.3
630	43.3
800	45.4
1000	46.4
1250	48.5
1600	53.2
2000	56.5
2500	56.9
3150	56.8
4000	56.8
5000	57.6
STC	**41**
Rw (C, C_{tr})	**41 (-3, -8)**

Officer conducting measurement

10 / 8 / 2004