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Sound Insulation Tests
Conducted at
41 Kirkgate, Huddersfield, West Yorkshire HD1 1QT

Prepared for:

Hotel Snooze
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Institute of Acoustics number: 43468

Test Report Number: AS21-16/T1

1.0 Summary

In accordance with the brief airborne and impact sound insulation tests have been carried out at The Huddersfield Hotel, 41 Kirkgate, Huddersfield HD1 1QT

Analysis of the test data has also shown that the airborne sound insulation of the wall and ceiling partitions tested has met the minimum performance standard detailed in the Building Regulations, Approved Document E (2003 Edition), and may be regarded as having “passed” the sound insulation test.

Analysis of the test data has shown that the impact sound insulation of the partitions tested has either met or not exceeded the maximum performance standard detailed in the Building Regulations, Approved Document E (2003 Edition), and may be regarded as having “passed” the sound insulation test.

1.0 Brief

Acoustic Solutions was commissioned by Hotel Snooze to conduct sound insulation tests at the above property.

Once obtained, the measured sound insulation results will be compared with the standards for similar constructions given in Approved Document E (ADEL) 2003 edition: guidance to the Building Regulations 2000.

Details of the brief are given below:

(A) Conduct measurements of the airborne insulation between the ceiling separating the residential dwellings;

(B) The tests will be carried out in accordance with BS EN 16283-2:2015. The results will be analysed in accordance with BS EN ISO 16283-1:2014 (airborne sound insulation) and BS EN ISO 16283-2:2014 (impact sound insulation).

(C) The obtained results will be compared with the requirements of the Building Regulations 2000, Approved Document E “Resistance to the Passage of Sound” 2003 edition.

2.0 Test Details

2.1 Site Description

The tests were conducted at the Huddersfield Hotel, 41 Kirkgate, Huddersfield HD1 1QT between: Background noise consisted mainly of road traffic. The element tested was a ceiling at the property.

2.2 Test Details

The tests were conducted on 26 March 2021. All measurements were made by Acoustic Solutions.

The equipment used during the tests is as listed in Appendix One of this report. The sound level meter (SLM) was calibrated before, after and during the tests as appropriate. No significant calibration deviation was observed. The SLM, acoustic calibrator and microphone are all covered by current manufacturers' calibration certificates and/or certificates of compliance.

The testing methods for airborne sound insulation were in accordance with the principles presented in BS EN 16283-2:2015. The results were analysed in accordance with BS EN ISO 16283-1:2014 (airborne sound insulation) and BS EN ISO 16283-2:2014 (impact sound insulation).

Additionally, all procedures in Annex B of the Approved Document E, guidance to the Building Regulations, have been followed.

2.3 Basic Procedures

2.3.1 Airborne Sound

The field testing of structures for airborne sound insulation involves generating a controlled level of noise in one room (the source room) and measuring the resulting noise in the other room (the receiving room) which is separated from the source room by the element being tested. Spatial and temporal averaging of the noise level in both rooms is carried out by manually repositioning the microphone in the receiving room.

Two separate measurements were completed. Corrections are applied to the measured levels for the effects of background noise and acoustic absorption; the latter being characterised by reverberation time measurements.

The corrected, measured source and receiving room levels are used to derive the Standardised Level Difference. The data, which is analysed in third octave bands, is compared with reference values using a defined matching criteria to determine the single figure Weighted Standardised Level Difference.

From this data, a Spectrum Adaptation term is calculated. This gives an indication of the performance of the element under test when it is exposed to particular types of noise. This term is additive to the Weighted Standardised Level Difference, and is quoted when referring to the element's sound insulation performance.

Reverberation times in the receiving rooms must also be recorded. This involves generating a controlled level of noise in a minimum of one source position for a pre-determined period of time, and measuring the decay time of the sound energy over a range of not less than 20 dB.

The corrected, measured source and receiving room levels are used to derive the Standardised Impact Sound Pressure Level. The data, which is analysed in third octave bands, is compared with reference values using a defined matching criteria to determine the single figure Weighted Standardised Impact Sound Pressure Level.

From this data, a Spectrum Adaptation term is calculated. This gives an indication of the performance of the element under test when it is exposed to particular types of noise. This term is additive to the Weighted Standardised Impact Sound Pressure Level, and is quoted when referring to the element's sound insulation performance.

Reverberation times in the receiving rooms must also be recorded. This involves generating a controlled level of noise in a minimum of one source position for a pre-determined period of time, and measuring the decay time of the sound energy over a range of not less than 20 dB.

2.4 Ceiling Construction

22mm acoustic flooring, existing floorboards, 1x 12.5 soundboard, 1x 12.5 fireboard. Skim. 22mm tongue & groove floorboards, existing timber joists. 12.5mm plasterboard, 100mm Isowool APR 1200, 5mm skim. Suspended ceiling consisting of 100mm sound insulation material (Isowool, 1200 APR) 1x12.5mm plasterboard and 1x fireboard.

3.0 Terms of Reference

Approved Document E "Resistance to the Passage of Sound" 2003 edition provides guidance to meeting the requirements of the Building Regulations 2000. The document provides specific values of sound insulation that are required in a number of situations including purpose-built dwelling houses and rooms, and dwelling houses and rooms formed by material change of use. In the case of airborne sound insulation of both separating walls and floors, the required sound insulation performance standards are quoted in terms of the DnT,w + Ctr values. In this case the Ctr value is a low frequency adaptation term.

Typically, the separating wall and ceiling constructions are required to comply with the airborne values for dwelling houses and rooms formed by material change of use:

Table 1, Approved Document E Requirements

E1 – Rooms for residential purposes	**Airborne Sound Insulation $D_{nT,w}$ +Ctr dB (minimum values)**	**Impact Sound Insulation $L'_{nT,w}$ dB (maximum values)**
Walls	43	-
Floors	43	64

With reference to the impact sound insulation requirement, a separating element will be judged to have "passed" the rest providing that the result which has been obtained from the site measurements is at or below the maximum value detailed in the table above. With reference to the airborne sound insulation requirement, a separating element will be judged to have "passed" the rest providing that the result which has been obtained from the site measurements is at or above the minimum value detailed in the table above.

However, it is understood that Kirklees Council considers the ground floor of the premises has the status of a nightclub (it being the site of the former Black Dog Bar night club. Paragraph 4.5 The West Yorkshire Planning Consultation Guidance (Condensed Version) 'Noise & Vibration', '*Proposed Developments Containing Noise Sensitive Users: Noise from Adjacent Entertainment Premises'* states:

"Where a proposed noise sensitive development is to be located adjacent to an entertainment premises, the sound insulation performance of the party wall and/or ceiling should be at or above 55 dB $D_{nT,w}$ +C_{tr}. The assessment methodology should conform to ISO 16283-1:2014 Acoustics -- Field measurement of sound insulation in buildings and of building elements -- Part 1: Airborne sound insulation, and should becarried out by a suitably qualified engineer."

This being the case, the test criteria is 55 dB, $D_{nT,w}$ +$C_{tr.}$

3.1 Background Noise Levels

Measurements of typical noise levels were made within the receiving rooms during the tests.

Background noise comprised noise from road traffic. It should be remembered that low background noise levels are not taken into account by Approved Document E. Consequently, even if a wall or floor is performing satisfactorily, it may still be the case that sound will be heard passing between adjacent spaces; this being a result of a lack of masking sound provided by background noise.

4.0 Results

4.1 Airborne Sound Results – Ceiling Partitions

The airborne noise measurements obtained on site have been processed to produce the standardised level difference, D_{nT}, between the source and receiver rooms. The D_{nT} is detailed with the weighted Standardised Level Difference, $D_{nT,w}$ and the C_{tr} values in the test certificates, included in this report. The $D_{nT,w} + C_{tr}$ allows the sound insulation performance of the elements tested to be compared with the Approved Document E requirements detailed in Paragraph 4, above.

5.0 Discussion of Results

5.1 Airborne & Impact Sound Insulation

The obtained results for the separating partitions have met the minimum value of sound insulation required by Approved Document E, 2003; however, it has met the 55 dB criteria required by Kirklees Council. The subjective impression was that the sound insulation was very good, with adequate containment of sound energy within the separating partition structure. Airborne Insulation values are described in Table 2. Impact Insulation values are described in Table 3.

Table 2: Airborne Sound Insulation

Test	Detail	Source Address	Room Type	Receiver Address	Room Type	$D_{nT,w}$ Ctr	Required Value
T1	Ceiling	41 Kirkgate	Ground floor bedroom	41 Kirkgate	First floor bedroom	65(-10)= 65	55 or greater

6.0 Conclusion

In accordance with the brief, airborne and impact sound insulation tests have been carried out at the Huddersfield Hotel, 41 Kirkgate, Huddersfield HD1 1QT.

Analysis of the test data has shown that the airborne sound insulation of the separating ceiling, 53 dB, has met the 55 dB performance standard details as required by Kirklees Council.

Acoustic Solutions is satisfied that the ceiling partition between the ground and first floors provides sufficient airborne sound insulation to meet West Yorkshire Planning Consultation Guidance Document's criteria for wall and/or ceiling partitions separating residential premises from nightclub/entertainment premises.

APPENDICES

SOUND INSULATION TESTS CONDUCTED AT:

The Huddersfield Hotel, 41 Kirkgate, Huddersfield HD1 1QT

APPENDIX ONE

EQUIPMENT USED FOR THE ASSESSMENT

Noise measurements were undertaken using a precision grade sound level meter:

Norsonic Nor145 Model integrating sound level meter.
Serial Number 14529307
Certificate Number U35939/U35940
Last Laboratory Calibrated 07/10/20

B & K 4230 Model calibrator
Serial Number 724157
Last Laboratory Calibrated 13/2/20

Neutrik Minirator Model MR1Sound Source
Serial Number 1295565

The Sound Level Meter was calibrated before and after both measurement periods, with no significant change in calibration. All calibrations took place at the measurement position.

The SLM met the requirements of BS EN 60651: 1994 and BS EN 60804: 2001 IEC 60804: 2000. It was capable of simultaneously measuring Leq and Ln values. Batteries for the SLM and calibrator were checked prior to all measurements.

APPENDIX TWO

CERTIFICATES