

REPORT REF: 21265R01aSWmdw

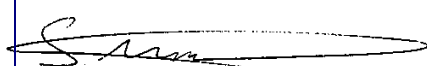
DETAILED KITCHEN PLANT NOISE IMPACT ASSESSMENT

PROPOSED GROUND FLOOR A3 UNIT, 38 – 41 HIGH STREET,
WREXHAM, LL13 8HY



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Revision Schedule:

Report	Date	Comment
21265R01SWmdw	12/08/2019	First issue
21265R01aSWmdw	03/10/2019	Updated with proposed plant details.

Executive Summary

Environoise Consulting Limited has been commissioned by Clydesdale Project Management to provide a kitchen plant noise impact assessment report for the proposed A3 unit (restaurant/bar) at 38 – 41 High Street, Wrexham, LL13 8HY.

Noise Survey

Unattended noise surveys were done between 10.00hrs on Tuesday 6th August 2019 and 11.00hrs on Wednesday 7th August 2019 to determine existing background noise levels at a position representative of the nearest noise-sensitive receptors overlooking the rear courtyard and High Street.

Detailed Plant Noise Impact Assessment

The rating plant noise level has been calculated to meet local authority requirements during the daytime (07.00 – 23.00hrs) period at the NSR overlooking the rear courtyard.

The proposed plant location is a greater distance from the NSR overlooking High Street and measured pre-existing background noise levels are higher along High Street, therefore, local authority requirements will be met by default.

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1 Introduction

1.1 Overview

- 1.1.1 Environoise Consulting Limited has been commissioned by Clydesdale Project Management Limited to provide limiting kitchen extract noise levels for the proposed A3 unit (restaurant/bar) at 38 – 41 High Street, Wrexham, LL13 8HY.

1.2 Site Description

- 1.2.1 The site is situated in central Wrexham and consists of derelict terraced buildings (to be refurbished) bound by High Street to the north, Church Street to the west and Yorke Street to the east.

2 Criteria

2.1 Planning Condition 7

2.1.1 The requirements¹ of local authority are as follows:

The rating level of any noise generated by air handling plant associated with the development shall not exceed the pre-existing background level by more than 5dB(A) at any time. The noise levels shall be determined at nearby noise sensitive premises, and measurements and assessment shall be made in accordance with BS 4142:2014 'Methods for rating and assessing industrial and commercial sound'.

2.2 BS 4142:2014

Overview

2.2.1 BS 4142:2014 'Methods for rating and assessing industrial and commercial sound'ⁱ provides a method for rating and assessing sound of an industrial and/or commercial nature. The scope specifically includes sound from industrial and manufacturing processes, sound from fixed plant, sound from loading and unloading of goods at industrial and commercial sites and mobile plant forming an intrinsic part of the overall sound from a premises or process.

2.2.2 The guidance gives the concept of 'context' to the process of identifying noise impact. Section 11 of BS 4142:2014 explains that:

'The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs (my emphasis). An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.'

2.2.3 It is therefore entirely possible that whilst the numerical outcome of a BS 4142:2014 assessment is indicative of adverse or significant adverse impact, when the proposal is considered in context the significance of the impact is reduced to an acceptable level. However, the opposite may also be true. There are many contextual points to consider when undertaking an assessment of sound impact including:

- The absolute level of sound.
- The character and level of the specific sound in the context of the existing noise climate. For instance, is the sound to occur in a location already characterised by similar activities as those proposed?
- The sensitivity of the receptors.
- The time and duration that the specific sound is to occur.
- The conclusions of assessments undertaken using alternative assessment methods, for example WHO guidelines noise values or change in noise level.

¹ As given in planning memorandum dated 10/05/2019 associated with application reference: P/2019/0330.

- The ability to mitigate the specific sound through various methods, for example by screening, the selection of quiet plant equipment, the use of attenuators and louvres, through the imposition of noise management plans and good practice, façade design and layout/orientation.
- The form and scale of a development. For example, does the proposed development involve new industrial or commercial premises being built or is the proposal the installation of new plant or an extension to existing premises?

2.2.4 The comparison of the 'rating level' with the 'background sound level' in the BS 4142:1997 assessment methodology is retained; however, new acoustic feature corrections are incorporated to determine the rating level.

Noise Character Corrections

2.2.5 A rating penalty can be applied to account for the character of the noise, namely tonality, impulsivity and intermittency. All corrections can be added together in linear fashion where appropriate.

Tonality

2.2.6 Tonality can be determined objectively (using adjacent third octave band analysis/the Joint Nordic method) or subjectively as listed below:

- +2dB penalty: Just perceptible.
- +4dB penalty: Clearly perceptible.
- +6dB penalty: Highly perceptible.

Impulsivity

2.2.7 The impulsivity is the rapidity of the change in sound level, it can be determined objectively (using Fast Fourier Transform analysis) or subjectively as listed below:

- +3dB penalty: Just perceptible.
- +6dB penalty: Clearly perceptible.
- +9dB penalty: Highly perceptible.

Other sound characteristics

2.2.8 Where the specific sound feature characteristics are neither tonal nor impulsive but distinguishable against the residual noise than a 3dB penalty can be applied

Intermittency

2.2.9 The intermittency is when the specific noise has identifiable on/off conditions where a 3dB penalty can be applied.

Assessment

2.2.10 In order to assess the impact, the 'Rating level' of the new noise source is compared with the existing 'Background level' and the following analysis made:

- Typically, the greater this difference, the greater the magnitude of the impact.

- A difference of around + 10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around + 5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

2.2.11 BS 4142 requires separate analysis for day and night-time periods. For the assessment of noise impacts, BS 4142 advises evaluating the specific sound over an appropriate reference time interval (T_r) of:

- 1 hour during the day (between 07:00 to 23:00 hours); and
- 15 minutes during the night (between 23:00 to 07:00 hours).

2.2.12 Additionally, the assessment methodology now requires that the issue of uncertainty be taken into consideration. The document explains how to reduce the element of uncertainty through good practice but is unclear on how one determines a numerical value.

3 Noise Surveys

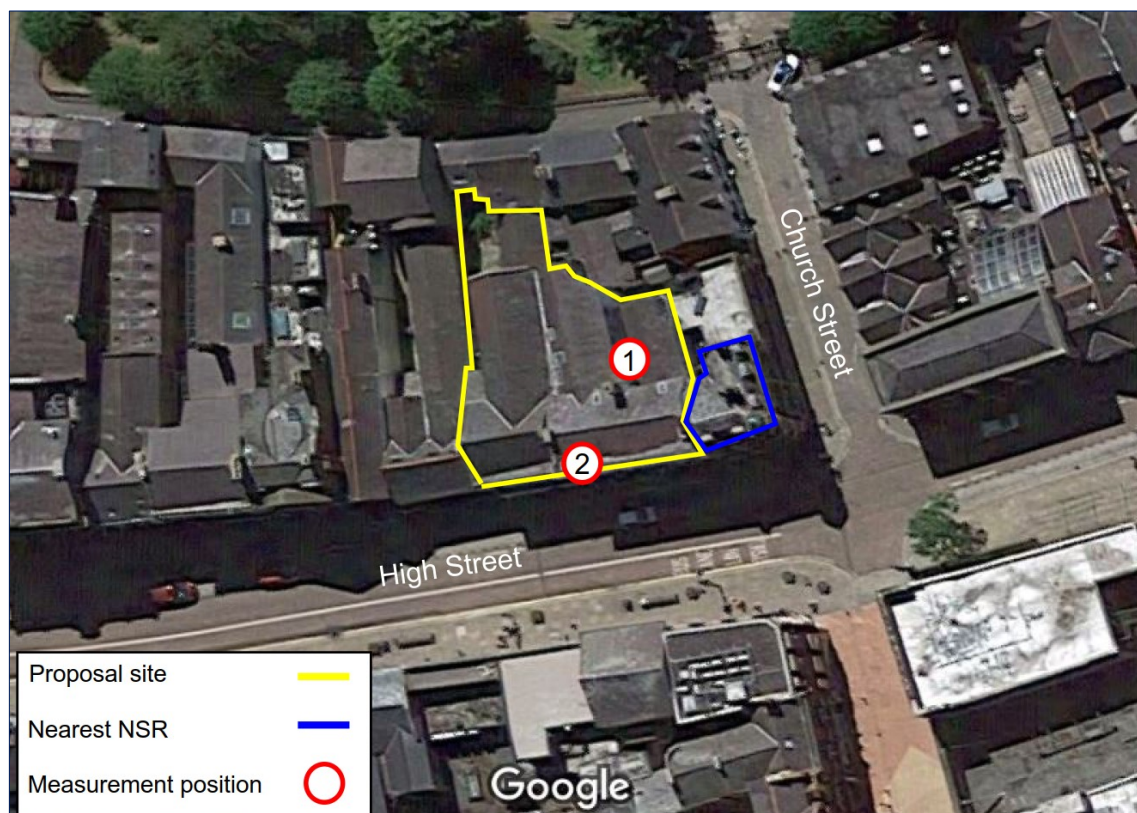
3.1 Unattended Noise Surveys

3.1.1 A-weighted background noise levels (L_{A90} (15mins)) and associated A-weighted octave band noise levels were measured for 15-minute contiguous periods between 10.00hrs on Tuesday 6th August 2019 and 11.00hrs on Wednesday 7th August 2019 at two positions as follows:

- **Position 1:** Measurement position was overlooking the rear courtyard. Noise sources were plant not associated with the development and occasional road traffic noise along High Street.
- **Position 2:** Measurement position was overlooking High Street. Noise sources were pedestrian and occasional road traffic noise along Church Street.

3.1.2 A microphone was attached to an extension pole and positioned out of a partially open, second-storey window for both measurement positions. Figure 3.1 displays measurement positions and the site boundary.

Figure 3.1: Noise measurement positions and site boundary.



3.2 Instrumentation

3.2.1 Details of instrumentation used are given in Table 3.1.

Table 3.1: Instrumentation details for noise surveys.

Manufacturer	Equipment type	Serial number	Laboratory calibration date
Rion	NA-28 sound level meter	00501403	7 th August 2018
	NH-23 preamplifier	22018	
	UC-59 microphone	07542	
	NC-74 calibrator	34904967	
	NL-52 sound level meter	00654072	16 th October 2017
	NH-23 preamplifier	54117	
	UC-59 microphone	08333	

3.3 Calibration

- 3.3.1 The sound level meters were calibrated at the start and end of the noise surveys. Meters were calibrated to 94.0 dB at 1kHz with no recorded drift greater than 0.2dB, as this is lower than 0.5dB at 1 kHz, the measurements are acceptable.

3.4 Weather Conditions

- 3.4.1 Weather data has been sourced from a local meteorological station. No noise measurements were taken during periods of rain or excessive wind speeds and so all measurements have been included in the assessment. A summary of weather conditions during the noise surveys is given in Table 3.2.

Table 3.2: Summary of weather during noise surveys.

Date	Rainfall	Maximum wind speed (m/s)	Temperature range (°C)	Observed cloud cover (oktas)
06.08.2019	None	5	16 - 23	3
07.08.2019		5	15 - 19	2

4 Results

4.1 Background Noise Levels for BS 4142 Noise Impact Assessments

- 4.1.1 Local authority requires that the pre-existing background noise level is not exceeded by at least 5dB when measured at the nearest noise sensitive receptor at any time. We have therefore used the lowest background noise level measured at both positions for the daytime (07.00 – 23.00hrs) period – given in bold in Table 4.1. The kitchen extract will not be used during the night-time period (23.00 – 07.00hrs)² and has therefore only the daytime period results have been reported.
- 4.1.2 All noise levels given in Table 4.1 include a -3dB correction to convert measured façade noise levels to free-field equivalent.

Table 4.1: Background noise levels measured at Positions 1 and 2.

Position	Measurement period	Background noise level range [L _{A90} (15min) (dB)]
1	Daytime: 6 th August (10.00 – 23.00hrs) 7 th August (07.00 – 11.00hrs)	35 – 49
2	Daytime: 6 th August (10.30 – 23.00hrs) 7 th August (07.00 – 11.00hrs)	39 – 51

² As informed in conversation between John Blaney and Sam Williams, Environoise Consulting Limited on site on Tuesday 6th August 2019.

5 Limiting Kitchen Extract Noise Levels

5.1 Limiting Kitchen Extract Noise Levels at NSR

- 5.1.1 The rating level of the kitchen extract should be the levels given in Table 5.1 which considers local authority requirements.

Table 5.1: Plant noise limits at NSRs.

NSRs	Period	Lowest measured background noise level [LA90 (15min) (dB)]	Limiting plant noise level at NSR [LAeq,T (dB)]
Rear	Daytime (07.00 – 23.00hrs)	35	40
Front (on High Street)	Daytime (07.00 – 23.00hrs)	39	44

N.B. A noise character correction should be applied in accordance with section 2.2 of this report if the extract contains any tonal, intermittent or impulsive acoustic characteristics. The total applicable penalty should be added to the specific plant noise levels and then compared to the plant noise limiting levels given in Table 5.1.

6 Plant Noise Impact Assessment

6.1 Proposed Plant Items

- 6.1.1 Details³ of proposed kitchen extract plant and attenuators are given in Tables 6.1 and 6.2 for the kitchen supply and extract respectively.
- 6.1.2 Conservative attenuation estimates of 5dB have been applied for the proposed weather louvre and additionally for building shielding between the supply plant and NSR.
- 6.1.3 Ducting insertion loss has been calculated for the extract plant using the provided mechanical services layout drawing⁴.

Table 6.1: Proposed kitchen supply plant and attenuator.

Plant	Sound power level [L _w (dB)] at octave centre frequency (Hz)							L _{WA} (dB)
	63	125	250	500	1k	2k	4k	
Systemair MUB 042 500D4 – supply	90	82	79	75	71	67	62	77
Systemair attenuator for MUB 042	-5	-9	-17	-30	-36	-33	-27	
Weather louvre	-5	-5	-5	-5	-5	-5	-5	
Shielding attenuation	-5	-5	-5	-5	-5	-5	-5	
Attenuated supply sound power level	75	63	52	35	25	24	25	52

Table 6.2: Proposed kitchen extract plant and attenuator.

Plant	Sound power level [L _w (dB)] at octave centre frequency (Hz)							L _{WA} (dB)
	63	125	250	500	1k	2k	4k	
Systemair MUB 062 560D4 – extract	93	85	82	78	74	70	65	80
Systemair attenuator for MUB 062	-5	-9	-17	-27	-33	-29	-21	
Ducting insertion loss	-16	-10	-4	-2	-3	-3	-3	
Attenuated extract sound power level	72	66	61	49	38	38	41	56

- 6.1.4 The proposed location for the additional head office plant is a distance of 8 metres away from the nearest NSR overlooking the rear courtyard and 11 metres from the nearest NSR overlooking High Street⁵.

6.2 Plant Noise Calculations to NSR

Determination of Sound Pressure Level at NSR overlooking Courtyard

- 6.2.1 Using the sound power level of the proposed plant, the calculated sound pressure level at the nearest receptor (L_{p,(NSR)}) has been calculated as follows:

$$L_{p,(NSR)} = (L_w (\text{supply}) - 20 \times \log (r) - 11 + D.I) + (L_w (\text{extract}) - 20 \times \log (r) - 11 + D.I)$$

³ Plant details received from John Blaney in email to Sam Williams, Environoise Consulting Limited dated 19th September 2019. Silencer details provided by Matthew Pickup, Inox Fabrications Limited in email dated 27th September 2019.

⁴ Inox Fabrications drawing 'Proposed kitchen vent', drawing number 001, dated 18th September 2019.

⁵ Distance calculated using Google Earth Pro.

$$L_{p,(NSR)} = (L_{w(supply)} - 20 \times \log(r) - 5) + (L_{w(extract)} - 20 \times \log(r) - 8)$$

Where:

$L_{p,(NSR)}$ = sound pressure level at NSR

$L_{w(supply)}$ = sound power level of supply

r = distance of plant to receptor overlooking courtyard (i.e. 8m)

D.I (Directivity Index): correction applicable for noise propagation from a source located at 1 plane (- 8) and 2 planes (- 5).

Therefore:

$$L_{p,(NSR)} = (52 - 20 \times \log(8) - 5) + (56 - 20 \times \log(8) - 8)$$

$$L_{p,(NSR)} = 29 + 30 = 32\text{dB}$$

Acoustic Feature Corrections

- 6.2.2 The kitchen supply and extract have identifiable on/off conditions as they are turned off once kitchen operations are completed; therefore, a 3dB penalty has been applied. Third-octave band data for the kitchen extract is not available and so a 2dB penalty has been applied to account for any tonal characteristics. A total acoustic feature correction of 5dB has been applied.

Assessment to NSR overlooking Courtyard

- 6.2.3 Table 6.3 compares the plant rating noise levels for the daytime (07.00 – 23.00hrs) period against plant noise limiting levels provided in Table 6.3.

Table 6.3: Kitchen supply/extract noise impact assessment.

	Daytime noise impact at rear courtyard NSR (07.00 – 23.00hrs)
Kitchen supply/extract specific noise level at NSR (dBA)	32
Acoustic feature correction (+3dB for intermittency, +2dB for tonality) (dB)	+5
Predicted kitchen extract rating noise level at NSR (dBA)	37
Limiting kitchen extract noise level (dBA)	40
Level of excess (dB)	0

Discussion

- 6.2.4 As shown in Table 6.3, the rating plant noise level has been calculated to meet local authority requirements during the daytime (07.00 – 23.00hrs) period at the NSR overlooking the rear courtyard.
- 6.2.5 The proposed plant location is a greater distance from the NSR overlooking High Street and measured pre-existing background noise levels are higher along High Street, therefore, local authority requirements will be met by default.

7 General Recommendations

7.1 Plant Isolation Target

- 7.1.1 Plant should have suitable isolation to achieve 95% isolation of frequencies of concern.
- 7.1.2 N.B. We do not give advice on specific vibration isolators (e.g. spring isolators) as typically manufactures/suppliers advise on this. However, in an effort to assist generic plant isolation advice is given below.

7.2 Plant Mounting

- 7.2.1 Plant vibration isolation measures should be considered where plant is proposed internally or externally (e.g. on the roof), even with a thick concrete construction. The level of isolation between plant item and fixing is dependent on the following factors:

- Mass of the plant (kg).
- Forcing frequency of plant item (Hz).
- Number of connections plant item has with wall.
- Plant is suitably distributed across all supporting points.

- 7.2.2 It is likely that rubber/spring anti-vibration mounts should be employed on concrete slabs between the plant and supporting structure. Manufacturers of such mounts should have a technical service to advise on the correct mounts to use. They will need to know the weights and weight distribution of the plant over the slab, and the lowest forcing frequency likely to be encountered. Such companies are:

- <http://www.christiegrey.com/ipf.html>
- <http://www.totalvibrationsolutions.com/>

- 7.2.3 Plant vibration isolators should be chosen such that the natural frequency of the item when mounted on the isolators is substantially below the forcing frequency of the item of plant and the natural frequency of the supported plant.

- 7.2.4 Connections from plant must be flexible to reduce vibration transfer.

- 7.2.5 Care must be taken in the orientation of any exhaust duct terminations and the noise level produced by the termination so that proposed apartments are not adversely affected.

7.3 Plant and Ductwork

Fan Coil Units (FCUs) and Heat Recovery Units (HRUs)

- 7.3.1 All fan coil units (FCUs) and heat recovery units (HRUs) should have a ≥ 10 mm neoprene washer either side of the supportive metal fixing so that the Unistrut has no contact with the FCU or HRU, unless the units have built in anti-vibration systems. This is so that any movement or excitation from the units is not transferred into the construction above.

Supporting Structures

- 7.3.2 No supporting ceiling hangers shall have contact with any plant or ductwork or their associated plant fixings within the ceiling void.
- 7.3.3 No ductwork shall sit directly on its metal supporting structure, a neoprene sleeve must be placed between the duct and supporting brace or strap.
- 7.3.4 Large plant proposed in ground floor areas e.g. AHUs or large FCUs shall need hanging on resilient hangers in addition all plant and ductwork must not sit directly on the supporting structure.

Appendix A: Acoustic Terms

Between the quietest audible sound and the loudest tolerable sound there is a million to one ratio in sound pressure (measured in Pascal, Pa). Because of this wide range a noise level scale based on logarithms is used in noise measurement called the decibel (dB) scale. Audibility of sound covers a range of approximately 0 to 140dB.

The human ear system does not respond uniformly to sound across the detectable frequency range and consequently instrumentation used to measure noise is weighted to represent the performance of the ear. This is known as the 'A weighting' and annotated as dB (A). Table A1 lists the sound pressure level in dB (A) for common situations.

Table A1: Noise levels for common situations.

Typical noise level dB(A)	Example
0	Threshold of hearing
30	Rural area at night, still air
40	Public library, refrigerator humming at 2m
50	Quiet office, no machinery, Boiling kettle at 0.5m
60	Normal conversation
70	Telephone ringing at 2m, Vacuum cleaner at 3m
80	General factory noise level, Heavy goods vehicle from pavement
90	Powered lawn motor, operators ear
100	Pneumatic drill at 5m
120	Discotheque – 1m in front of loudspeaker
140	Threshold of pain

The noise levels at a measurement point are rarely steady, even in rural areas, and vary over a range dependent upon the effects of local noise sources. Close to a busy motorway, the noise levels may vary over a range of 5dBA, whereas in a suburban area this may increase up to 40dBA and more due to the multitude of noise sources in such areas (cars, dogs, aircraft etc.) and their variable operation. Furthermore, the range of night-time noise levels will often be smaller and the levels significantly reduced compared with daytime levels. When considering environmental noise, it is necessary to consider how to quantify the existing noise (the ambient noise) to account for these second to second variations.

Human subjects are generally only capable of noticing changes in steady levels of no less than 3dBA. It is generally accepted that a change of 10dBA in an overall, steady noise level is perceived to the human ear as a doubling (or halving) of the noise level. (These findings do not necessarily apply to transient or non-steady noise sources such as changes in noise due to change in road traffic flow, or intermittent noise sources). The equivalent continuous A-weighted sound pressure level, L_{Aeq} , is the single number that represents the average sound energy measured over that period. The L_{Aeq} is the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period. It is commonly used to express the energy value from individual sources that vary in level over their operational cycle. Appendix A: Building acoustic terms

Appendix B: Building Acoustic Terms

Absorption

Conversion of sound energy to heat, often by the use of a porous material.

Absorption coefficient

A quantity characterizing the effectiveness of a sound absorbing surface. The proportion of sound energy absorbed is given as a number between zero (for a fully reflective surface) and one (for a fully absorptive surface). Note that sound absorption coefficients determined from laboratory measurements may have values slightly larger than one. See BS EN 20354:1993.

Absorptive material

Material that absorbs sound energy.

Airborne sound

Sound propagating through the air.

Airborne sound insulation

Airborne sound insulation is insulation that reduces the transmission of airborne sound (sound that propagates through air) between buildings or parts of buildings. Airborne sound insulation between two rooms is calculated from the difference between sound pressure levels in the source and receiving rooms, plus a factor taking into account the absorption in the receiving room. The most commonly used rating factor is the Standardized level difference, $D_{nT,w}$ – see below.

Decibel (dB)

The unit used for many acoustic quantities to indicate the level with respect to a reference level.

D_{nT}

The difference in sound level between a pair of rooms, in a stated frequency band, corrected for the reverberation time. See BS EN ISO 140-4:1998.

$D_{nT,w}$

A single-number quantity which characterizes the airborne sound insulation between rooms. See BS EN ISO 717-1:1997.

$D_{nT,w} + C_{tr}$

A single-number quantity which characterizes the airborne sound insulation between rooms using noise spectrum no. 2 as defined in BS EN ISO 717-1:1997. See BS EN ISO 717-1:1997.

C_{tr}

The correction to a sound insulation quantity (such as $D_{nT,w}$) to take account of a specific sound spectra. See BS EN ISO 717-1:1997.

Direct transmission

The process in which sound that is incident on one side of a building element is radiated by the other side.

Dynamic stiffness

A parameter used to describe the ability of a resilient material or wall tie to transmit vibration. Specimens with high dynamic stiffness (dynamically 'stiff') transmit more vibration than specimens with low dynamic stiffness (dynamically 'soft'). See BS EN 29052-1:1992 for resilient materials. See BRE Information Paper IP 3/01 for wall ties.

Flanking element

Any building element that contributes to sound transmission between rooms in a building that is not a separating floor or separating wall.

Flanking transmission

Sound transmitted between rooms via flanking elements instead of directly through separating elements or along any path other than the direct path.

Floating floor

A floating floor consists of a floating layer and resilient layer (see also resilient layer and floating layer).

Floating layer

A surface floor layer that rests on a resilient layer and is therefore isolated from the base floor and the surrounding walls (see also resilient layer).

Framed wall

A partition consisting of board or boards connected to both sides of a wood or metal frame.

Frequency

The number of pressure variations (or cycles) per second that gives a sound its distinctive tone. The unit of frequency is the Hertz (Hz).

Frequency band

A continuous range of frequencies between stated upper and lower limits, (see also octave band and one-third-octave band).

Hertz (Hz)

The unit of the frequency of a sound (formerly called cycles per second).

Impact sound

Sound resulting from direct impact on a building element.

Impact sound insulation

Sound insulation which reduces impact sound transmission from direct impacts such as footsteps on a building element.

Independent ceiling

A ceiling which is fixed independently of a separating floor or an internal floor (see separating floor and internal floor).

Internal floor

Any floor that is not a separating floor (see separating floor).

Intermediate landing

A landing between two floors (see also landing).

Internal wall

Any wall that does not have a separating function.

Isolation

The absence of rigid connections between two or more parts of a structure.

Landing

A platform or part of floor structure at the end of a flight of stairs or ramp.

L'_{nT}

The impact sound pressure level in a stated frequency band, corrected for the reverberation time. See BS EN ISO 140-7:1998.

$L'_{nT,w}$

A single-number quantity used to characterize the impact sound insulation of floors. See BS EN ISO 717-2:1997.

Noise

Noise is unwanted sound.

Octave band

A frequency band in which the upper limit of the band is twice the frequency of the lower limit.

One-third-octave band

A frequency band in which the upper limit of the band is $2^{1/3}$ times the frequency of the lower limit.

R_w

A single-number quantity which characterizes the airborne sound insulation of a material or building element in the laboratory. See BS EN ISO 717-1:1997.

Resilient layer

A layer that isolates one element from another, reducing the vibration transmission between them. A resilient layer is used to provide a 'floating' floor so that there is some isolation between the floating floor and the base floor and surrounding walls.

Reverberation

The persistence of sound in a space after a sound source has been stopped.

Reverberation time

The time, in seconds, taken for the sound to decay by 60 dB after a sound source has been stopped. It is proportional to the room volume, and inversely proportional to the total absorption, and so can be estimated if the absorption coefficients of the main surfaces and features in the room are known.

Separating floor

A floor that separates flats or rooms for residential purposes.

Separating wall

A wall that separates adjoining dwelling-houses, flats or rooms for residential purposes.

Sound pressure level

A quantity related to the physical intensity of a sound.

Sound reduction index (*R*)

A quantity, measured in a laboratory, which characterizes the sound insulating properties of a material or building element in a stated frequency band. See BS EN ISO 140-3:1995.

Spectrum

The composition of a particular sound in terms of separate frequency bands.

Structure-borne sound

Sound which is carried via the structure of a building.

Surface mass

Mass per unit area, expressed in kilograms per metre squared (kg/m²).

ΔL_w

The measured improvement of impact sound insulation resulting from the installation of a floor covering or floating floor on a test floor in a laboratory. See BS EN ISO 717-2:1997.

References

ⁱ BS 4142:2014 'Methods for rating and assessing industrial and commercial sound'.