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ACOUSTICS PLUS

# New Residential Development

## 52 Coldharbour Lane, Hayes, UB3 3EP.

## Noise Impact Assessment

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| Noise Impact Assessment<br>New Residential Development | |
|---|---|
| Project Address: | 52 Coldharbour Lane<br>Hayes<br>UB3 3EP |
| Project Reference: | 104753 |

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| | Print: | Title: | Date: |
|---|---|---|---|
| **Author:** | **Andy Dodd** | **Senior Consultant** | **25/06/2025** |
| **Reviewer:** | **Phil Huffer** | **Principal Consultant** | **25/06/2025** |

# 1. INTRODUCTION

1.1 Acoustics Plus Ltd (APL) is an independent firm of multi-disciplinary acoustic engineers. APL is engaged by both private and public sector clients. APL is a registered member of The Association of Noise Consultants (ANC) and the author is a corporate member of The Institute of Acoustics (IOA).

1.2 APL has been instructed by Kamal Property Services Ltd to consider and advise upon the noise implications regarding the erection of three storey building (plus basement level) to provide a mixed use building comprising commercial Class E and Class F1 units and 9No. flats with associated refuse, parking and landscaping following demolition of the existing building.

1.3 It is understood that the Local Planning Authority (LPA) will require additional information, specifically in regard of noise. It is further understood that the noise matters are in connection with the proposed new residential accommodations proximity to nearby highways and commercial activities.

1.4 The object of this report is to determine environmental noise levels at the proposed site in accordance with Government planning policy. Outline comments regarding noise control measures are provided to demonstrate that the ingress of noise may be properly controlled.

1.5 The report will give due regard to the following documents:

*a) National Planning Policy Framework; February 2025 – Ministry of Housing, Communities & Local Government.*

*b) Noise Policy Statement for England (NPSE) March 2010 – Department for Environment, Food and Rural Affairs.*

*c) ProPG: Planning and Noise May 2017 Professional Practice Guidance on Planning and Noise.*

d) BS 8233:2014 “Sound insulation and noise reduction for buildings – Code of Practice”.

1.6 This report has been prepared by Acoustics Plus Limited (APL) with all reasonable skill, care, and diligence in accordance with generally accepted acoustic consultancy principles and taking account the services and terms agreed between APL and our client.

1.7 Any information provided by third-parties and referred to herein may not have been checked or verified by APL unless expressly stated otherwise. Certain statements made in the report are predictions based on reasonable assumptions and good industry practice.

1.8 Such statements involve risk and uncertainty which could cause measured and predicted results to differ materially. APL does therefore not guarantee or warrant any prediction contained in this report.

## 2. BASELINE SITUATION

2.1 The Application Site (the "site") is located at 52 Coldharbour Lane, Hayes, UB3 3EP. A sitemap plan is shown in Diagram 1 below.


Diagram 1

2.2 The application proposes the erection of three storey building (plus basement level) with to provide a mixed use building comprising commercial Class E and Class F1 units and 9No. flats with associated refuse, parking and landscaping following demolition of the existing building.

2.3 The site and surrounding area are shown within the Figures appendix of this report.

# 3. NOISE CRITERIA

## NATIONAL PLANNING POLICY FRAMEWORK

3.1 The National Planning Policy Framework (NPPF) was most recently updated in February 2025 and has replaced planning policy guidance which previously covered planning and pollution control and new development in England. The purpose of the planning system is to contribute to the achievement of sustainable development. There are three dimensions to sustainable development: economic, social and environmental. The environmental role is to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

3.2 One of the core planning principles is to contribute to conserving and enhancing the natural environment and reducing pollution. Planning policies and decisions should contribute to and enhance the natural and local environment by;

- *protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan).*
- *recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland.*
- *maintaining the character of the undeveloped coast, while improving public access to it where appropriate.*
- *minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures and incorporating features which support priority or threatened species such as swifts, bats and hedgehogs.*
- *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*
- *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.*

3.3 Paragraph 198 of the NPPF states Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

3.4 Paragraph 187 of the NPPF states that:

*"Planning policies and decisions should contribute to and enhance the natural and local environment by…. e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability."*

3.5 The Governments long-term policy aims relating to noise are contained in the Noise Policy Statement for England (referred to as NPSE). Stated aims of the NPSE are:

*"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy of sustainable development:*

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life.*

3.6 The Professional Practice Guidance on Planning and Noise (ProPG) has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England. The recommended ProPG internal noise level guidelines are described in the table below. These guidelines reflect and extend current practice contained in BS8233:2014 (Sound Insulation and Noise Reduction for Buildings – Code of Practice). For clarity, blue italic font is used to highlight additions to the guidance contained in Table 4 of BS8233:2014. The dB values provided in the table for different activities are target levels. The table plus supporting notes are referred to as ProPG internal noise level guidelines.

| Activity | Location | 07:00-23:00hrs | 23:00-07:00hrs |
|---|---|---|---|
| Resting | Living room | 35dB $L_{Aeq,16hr}$ | - |
| Dining | Dining room/area | 40dB $L_{Aeq,16hr}$ | - |
| Sleeping (daytime resting) | Bedroom | 35dB $L_{Aeq,16hr}$ | 30dB $L_{Aeq,8hr}$<br>45dB $L_{Amax,F}$ |

Table 1

*NOTE 1 The Table provides recommended internal LAeq target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.*

*NOTE 2 The internal LAeq target levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the internal LAeq target levels recommended in the Table.*

*NOTE 3 These internal LAeq target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.*

*NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or LAmax,F, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB LAmax,F more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A).*

*NOTE 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal LAeq target levels should not normally be exceeded, subject to the further advice in Note 7.*

*NOTE 6 Attention is drawn to the requirements of the Building Regulations.*

*NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal LAeq target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal LAeq levels start to exceed the internal LAeq target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal LAeq levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form* (see Section 3.D).

## COMMERCIAL NOISE INGRESS

3.7 This assessment considered the principals of contained within Policy D 14 Noise of The London Plan 2021:

> **Policy D14 Noise**
>
> A In order to reduce, manage and mitigate noise to improve health and quality of life, residential and other non-aviation development proposals should manage noise by:
>
> 1) avoiding significant adverse noise impacts on health and quality of life
> 2) reflecting the Agent of Change principle as set out in Policy D13 Agent of Change
> 3) mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on existing noise-generating uses
> 4) improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity)

3.8 In demonstrating that the development proposals are suitably mitigated and that the commercial uses proposed to be located below the site would adversely impact the residential dwellings above, guidance regarding the noise levels not to be exceeded from commercial noise ingress has been taken from Approved Document E.

3.9 The development will require pre-completion sound insulation testing under Approved Document E 2015 of The Building Regulations 2010. The performance requirements of Approved Document E are detailed below:

Table 0.1a **Dwelling-houses and flats – performance standards for separating walls, separating floors, and stairs that have a separating function**

| | Airborne sound insulation sound insulation $D_{nT,w} + C_{tr}$ dB (Minimum values) | Impact sound insulation $L'_{nT,w}$ dB (Maximum values) |
|---|---|---|
| **Purpose built dwelling-houses and flats** | | |
| Walls | 45 | - |
| Floors and stairs | 45 | 62 |
| **Dwelling-houses and flats formed by material change of use** | | |
| Walls | 43 | - |
| Floors and stairs | 43 | 64 |

3.10 The site can be categorised as new build *"purpose built dwelling - houses and flats"* under Approved Document E 2015 of the Building Regulations 2010. Purpose built dwelling-houses and flats, the minimum airborne performance is $D_{nT,w} + C_{tr}$ 45dB.

3.11 Given the nature of the possible ground floor commercial use and the potential for higher than normal domestic noise levels to be generated, it is recommended that an enhanced performance is targeted.

3.12 In this instance it would be reasonable to target +10dB better than the minimum performance requirements of Approved Document E, so the enhanced minimum airborne performance targeted would be $D_{nT,w}$ + $C_{tr}$ 55dB ($D_{nT,w}$ + $C_{tr}$ 45dB+10dB).

## 4. NOISE OUTLINE

4.1 In order to determine the environmental noise level, consideration has been given to the noise levels on the site from the presence of commercial/transportation noise impacting the site.

4.2 Unmanned measurements were obtained over a 24 hour period at first floor level at the front and rear of the site, these locations were chosen to represent worst case noise levels that would be experienced at the façades of the proposed new residential accommodation from noise sources impacting the development.

4.3 The particulars of the measurement exercise are recorded below:

| | |
|---|---|
| Date: | 2nd – 3rd June 2025 |
| Start Time: | 11:30 hrs |
| Location: | First floor level at front and rear of site. |

4.4 The measurements carried out during the exercise are recorded below.

$L_{Aeq, 2mins}$ (dB re 20μPa) - average equivalent sound pressure level
$L_{Amax, 2mins}$ (dB re 20μPa) – maximum sound pressure level.

4.5 A level vs time summary of the noise data obtained at the site is presented in Diagrams 2 and 3.

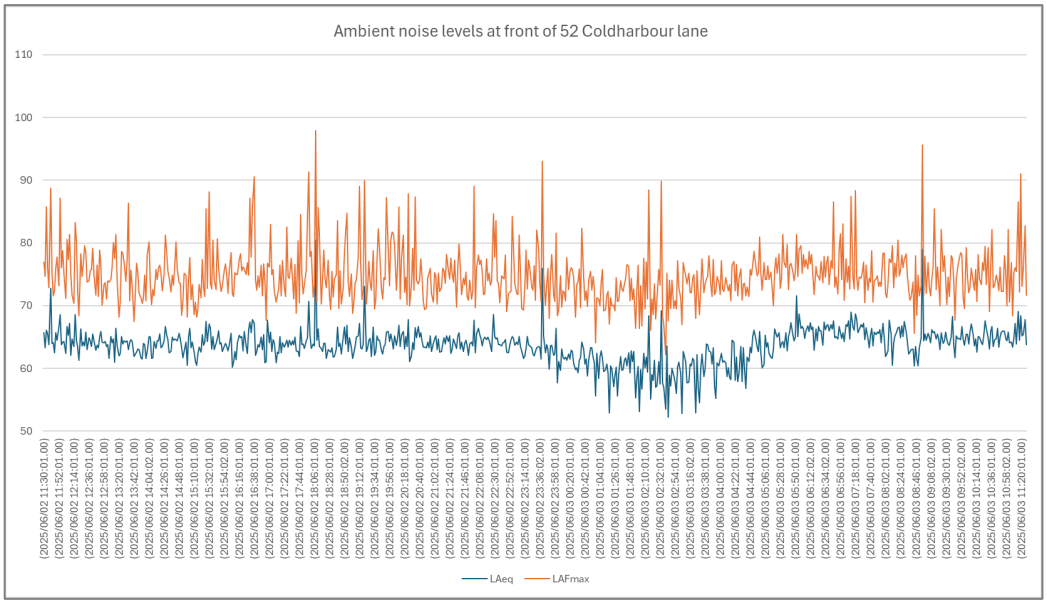



Diagram 2 – level vs time history at front of the site

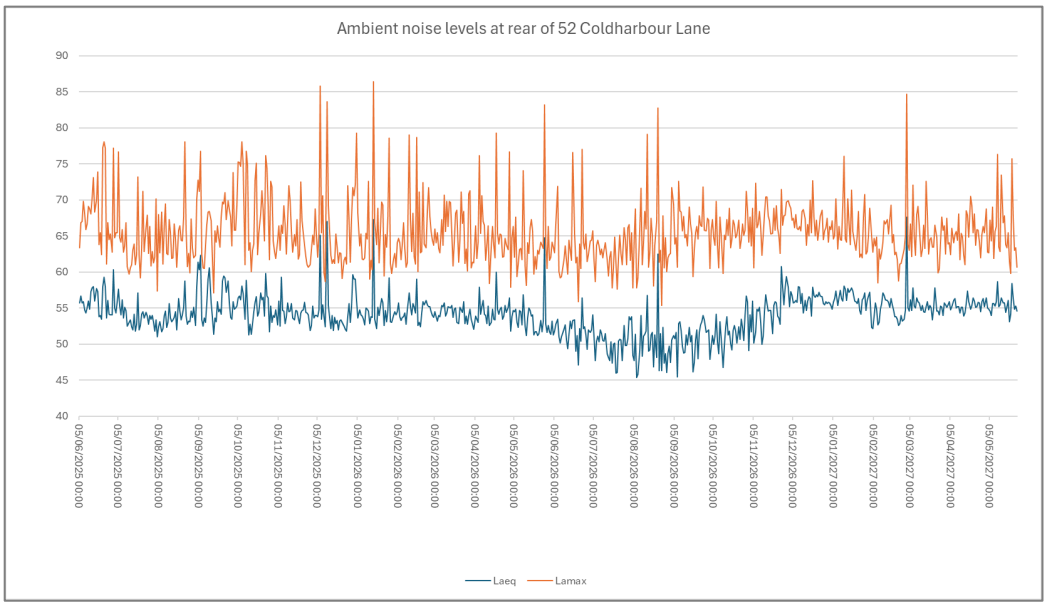



Diagram 3 – level vs time history at rear of the site

## 5. EQUIPMENT

5.1 All measurements were obtained using the following equipment. The relevant equipment carries full and current traceable calibration. The equipment, where necessary, was calibrated prior to and after the measurements were carried out.

- *Norsonic NOR-140 Serial No. 1403466*
- *Rion NA28 Serial No. 00370311*
- *Rion Calibrator Type NC-74 Class 1 Serial No. 00410215*

## 6. BUILDING ENVELOPE ASSESSMENT

6.1 Given the monitoring position and the measurements obtained, it is possible to calculate the $L_{Aeq,\ T}$ values experienced during the experienced during the day and night-time periods.

6.2 For the purposes of this report and in line with the recommendation of BS8233, the following time periods have been calculated.

*(a) 07:00 hrs to 23:00 hrs for living rooms/dining rooms.*
*(b) 23:00 hrs to 07:00 hrs for bedrooms.*

6.3 The measurements are based on the day and night time period $L_{Aeq,2min}$ and $L_{Amax,2mins}$ measurements obtained during the measurement exercise at the site. The results obtained are detailed below.

| Location | Daytime 07:00 to 23:00hrs | Night time 23:00 to 07:00hrs | 15th highest[1] $L_{Amax}$ dB |
|---|---|---|---|
| Front | 65dB | 63dB | 79dB |
| Rear | 56dB | 54dB | 71dB |

Table 2

## 7. BUILDING ENVELOPE RECOMMENDATIONS

7.1 It is recommended that in order to address the internal noise requirements of BS8233:2014, acoustic fenestration measures will be considered in order to protect the daytime and night-time amenity of future occupiers.

7.2 This should minimise future residents complaining about noise from urban traffic movements and commercial activity noise in the neighbourhood.

7.3 It has been determined that passive background ventilation is to be provided to the new residential dwellings. The internal noise requirements of BS8233 can only be met with windows closed.

[1] *From the data, the 15th highest $L_{Amax,F}$ measurement during the night time period at the façade has been considered, this is taken from WHO Guidelines for Community Noise – which states "For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB $L_{Amax}$ more than 10-15 times per night" (Vallet and Vernet 1991).*

7.4 To reduce daytime and night-time noise exposure in the proposed dwellings, attention should be given to the sound insulation of the façade of the building. The windows will normally be the weakest part of any façade.

7.5 Based on the outline information supplied, it is anticipated the external wall, mansard and roof constructions on site will have insulation values as detailed in Table 3 below. These performance values were obtained from proprietary prediction software 'Insul' written by Marshall Day. The values predicted have been corrected to account for workmanship, onsite installation and the differences between lightweight and heavyweight construction systems.

| Construction | Insulation value | Prediction correction |
|---|---|---|
| External wall (cavity masonry) | $R_w$ 52dB | -4dB |
| Mansard wall (steel frame) | $R_w$ 66dB | -7dB |
| Roof (warm type roof) | $R_w$ 64dB | -7dB |

Table 3

7.6 A copy of the prediction outputs for the noted constructions are contained within Appendix A of this report. Given the external noise levels, it is essential that the glazing performances as calculated are met. This will provide the necessary sound insulation values to reduce the internal noise levels to an acceptable level.

7.7 If the constructions were to be revised, the performance values should be checked prior to the change of use, to ensure the internal noise level requirements of BS8233:2014 are still met.

7.8 From the calculated levels it is possible to predict the internal noise levels within habitable rooms. In order to undertake this, consideration has been given to the following formula:

$$SPL_{in} = SPL_{out} + 10Log_{10}\left(\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S}{A}\right) + 3$$

where:

| | | |
|---|---|---|
| $SPL_{in}$ = | sound pressure level inside the room |
| $SPL_{out}$ = | highest sound pressure level outside the room |
| $A_0$ = | reference absorption area of $10m^2$ |
| $S_{wi}$ = | area in $m^2$ of the windows of the room |
| $S_{ew}$ = | area in $m^2$ of the external wall of the room |
| $R_{wi}$ = | weighted sound reduction index of window ($R_w$+$C_{tr}$) |
| $R_{ew}$ = | weighted sound reduction index of external wall |
| S = | area through which sound is transmitted ($m^2$) |
| A = | amount of acoustic absorption in room ($m^2$) |
| K = | a numerical factor associated with sound incidence |

Equation 1

7.9 Room dimensions and the size of windows have been extracted from scaled drawings. For the purposes of the calculation exercises, the accommodation types proposed at each level has been assessed.

7.10 Due to the varying methods of quantifying the sound insulation performance of building elements, the following parameters are described:

- *$R_w$ Weighted Sound Reduction Index: Single figure sound insulation value derived from the measured sound reduction index R.*

7.11 To meet the criteria, Equation 1 was rearranged in terms of $R_w$ (the sound reduction index of the window). The window specification required in order to achieve the internal noise levels as set out in BS8233 is shown in Table 4. Details of the elements assessed within the calculation exercises are contained within Appendix B of this report.

| Location | Sound Reduction Index ($R_w$) | $D_{n,e,w}$ |
|---|---|---|
| Levels 01 & 02 habitable rooms (front) | 35dB | 55dB |
| Level 03 habitable rooms (front) | 35dB | 39dB |
| Levels 01, 02 &03 all habitable rooms (rear) | 34dB | 33dB |

Table 4

7.12 To achieve the values of $R_w$ as specified in Table 4, a number of glazing systems were reviewed. The required window performance can be achieved using the following glazing configuration (taken from Guardian Glass):

| Required window performance | Glazing configuration (example) |
|---|---|
| 34dB $R_w$ | 6mm float glass<br>10mm cavity<br>4mm Float glass |
| 35dB $R_w$ | 8mm float glass<br>10mm cavity<br>6mm Float glass |

Table 5

7.13 The suggested window specification is detailed in Appendix C. This glass has published performance data. The published performance figures for the 'glass only' were obtained from laboratory measurements. The best workmanship practices and installation guidelines should be followed to ensure that the stated performances can be obtained once installed within a frame.

7.14 To achieve the $D_{n,e,w}$, as specified in Table 4, a Simon Acoustics frame ventilator ($D_{n,e,w}$ 33dB), Greenwood AWV39 wall ventilator ($D_{n,e,w}$ 39dB) or Greenwood MA3051 wall vent ($D_{n,e,w}$ 55dB) was used. Other frame or wall vents with equal or better performance are available. For the benefit of the calculation exercise, 2no. vents were assumed for the living room and 1no. vent for the bedroom spaces.

7.15 Alternatively, a window system (glass and frame) matching or exceeding the octave band performances detailed within the calculation exercises (Appendix B) would be acceptable, the minimum octave band performance levels required for any window system (glass and frame) are confirmed below in Table 6.

| Minimum performance requirements | SRI Octave Band Centre Frequency (Hz) dB | | | | | | | | $R_w$ |
|---|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | |
| 34dB $R_w$ | - | 27 | 26 | 28 | 37 | 36 | 29 | - | 34dB |
| 35dB $R_w$ | - | 30 | 27 | 29 | 38 | 35 | 35 | - | 35dB |

Table 6

### VENTILATION

7.16 Ventilation requirements for dwellings (and other buildings) are covered under the Building Regulations 'Approved Document F – Means of Ventilation, 2010 Volume 1:Dwellings (ADF).

7.17 ADF requires that: "There shall be adequate means of ventilation provided for people in the building".

7.18 Ventilation is required for the following purposes:

(a) *Extracts water vapour and indoor pollutants from areas where they are produced in significant quantities.*
(b) *Supplies a minimum level of outdoor air for occupants' health.*
(c) *Rapidly dilutes indoor air pollutants and disperses water vapour when necessary.*

7.19 ADF describes three types of ventilation provision and associated use. The types of ventilation are summarised below:

| Type of ventilation | Location | When is this required |
|---|---|---|
| Extract Ventilation | Kitchens<br>Utility rooms<br>Bathrooms<br>Sanitary accommodation | Continuous or Intermittent |
| Whole Dwelling Ventilation | All habitable rooms | Continuously |
| Purge Ventilation | All habitable rooms | Occasionally |

Table 7

7.20 It is currently proposed to install 'extract ventilation' to the residential units. In addition to the above ADF also states:

*"Purge ventilation should be capable of extracting at least four air changes per hour per room directly to the outside*."

7.21 If required to demonstrate compliance with Part O of the Building Regulations, it is likely that higher purge ventilation rates than those given above will be required.

# 8. GROUND FLOOR COMMERCIAL NOISE INGRESS

8.1 In order to produce a noise assessment to demonstrate that noise when considering the proposed 'ground floor commercial use and to mitigate and minimise any potential adverse impact of noise, as a result of the new development. Consideration must be given to the typical noise levels likely to be generated within the commercial use at ground floor level.

8.2 It has been assumed that the ground floor commercial unit could generate higher than normal domestic noise levels given the large open plan workplace. The recommended enhanced performance for the floor construction separating the commercial and residential elements has been targeted to achieve an airborne performance of $D_{nT,w} + C_{tr}$ 55dB.

8.3 The materials and construction methods are yet to be finalised but when the scheme details are confirmed during the detailed design stage, a suggested enhanced airborne performance of $D_{nT,w} + C_{tr}$ 55dB can be achieved.

# 9. CONCLUSION

9.1 With regard to the permitted development, it can be concluded that:

*(a) The general noise climate was impacted by commercial activity and urban traffic movements at the front and rear of the site.*

9.2 Based on the foregoing building envelope assessment, it can be concluded that:

*(a) Glazing systems with the appropriate acoustic performance (Table 4) would provide sufficient attenuation from noise levels impacting the site and reduce internal noise levels to not exceed the upper limit levels stated within ProPG, BS 8233:2014 and WHO guidelines for Community Noise.*

*(b) The required level of sound insulation needed to achieve this internal level is based on the building envelope make up considered.*

*(c) Passive ventilation is proposed for the residential units to provide adequate background ventilation and to avoid having to open windows. Ventilators with the relevant acoustic performance (Table 4) would provide sufficient attenuation to reduce internal noise levels to meet the minimum requirements recommended within ProPG, BS8233:2014 and World Health Organisation (WHO) guidelines.*

9.3 Ground floor commercial noise ingress will target an airborne performance target of $D_{nT,w} + C_{tr}$ 55dB to separate the different uses ay ground and first floor level, evidence of the construction method will be provided during the detailed design stage.

# Figures

**52 Coldharbour Lane, Hayes, UB3 3EP.**

Figure 1


Figure 2


Figure 3


Figure 4


Figure 5


Figure 6


Figure 7

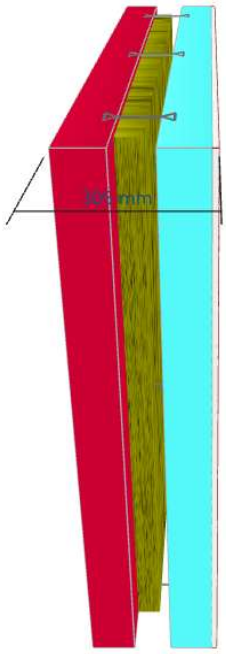

Figure 8

# Appendix A

# Sound Insulation Prediction (v9.0.24)


Margin of error is generally within Rw ±3 dB
- Key No. 2501
Job Name: 52 Coldharbour Lane
Job No.: 104753 Initials:AD
Date:03/06/2025
File Name:Insul external wall.ixl

Notes:External wall



**Rw 52 dB**
C -1 dB
Ctr -4 dB

Mass-air-mass resonant frequency = =23 Hz

Panel Size = 2.7 m x 4.0 m

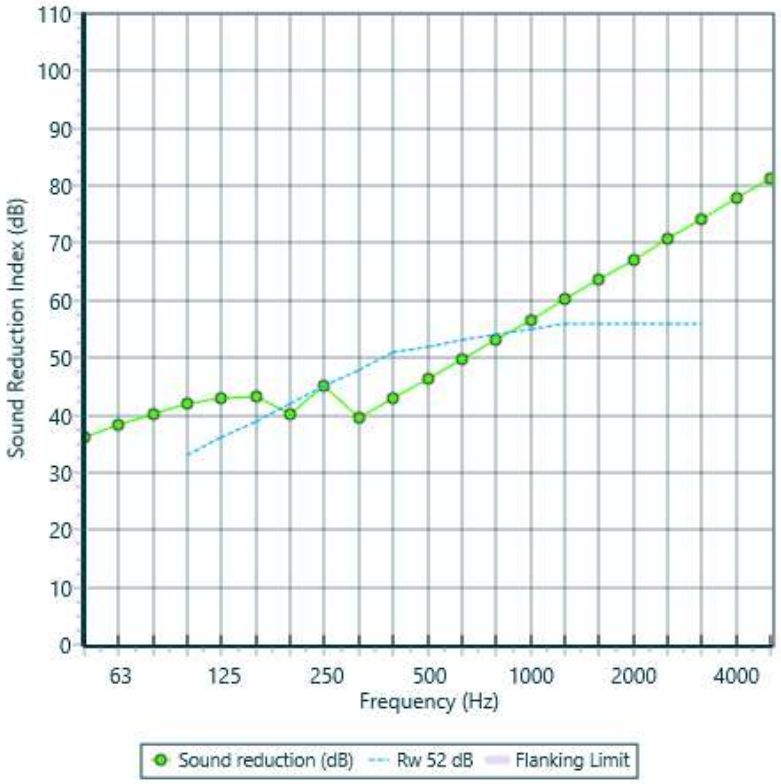
Partition surface mass = 253 kg/m²

## System description

Panel 1 : 1 x 102.5 mm Brick

Frame: Butterfly Tie (90 mm x 45 mm ), Stud spacing 600 mm ; Cavity Width 90 mm , 1 x Fibreglass (10kg/m3) 60mm Thickness 60 mm
Panel 2 : 1 x 100 mm blockwork 800kg density + 1 x 12.5 mm Gyproc Wallboard 12.5mm

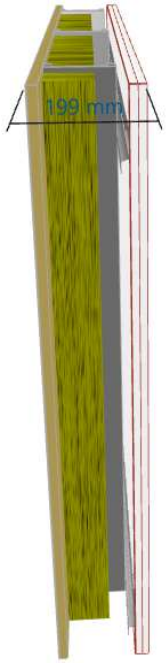
| freq.(Hz) | R(dB) | R(dB) |
|---|---|---|
| 50 | 36 | |
| 63 | 38 | 38 |
| 80 | 40 | |
| 100 | 42 | |
| 125 | 43 | 43 |
| 160 | 43 | |
| 200 | 40 | |
| 250 | 45 | 41 |
| 315 | 40 | |
| 400 | 43 | |
| 500 | 46 | 46 |
| 630 | 50 | |
| 800 | 53 | |
| 1000 | 57 | 56 |
| 1250 | 60 | |
| 1600 | 64 | |
| 2000 | 67 | 66 |
| 2500 | 71 | |
| 3150 | 74 | |
| 4000 | 78 | 77 |
| 5000 | 81 | |



# Sound Insulation Prediction (v9.0.24)


Margin of error is generally within Rw ±3 dB
- Key No. 2501
Job Name: 52 Coldharbour Lane
Job No.:104753 Initials:AD
Date:03/06/2025
File Name:Insul mansard wall.ixl

Notes:Mansard wall




**Rw 66 dB**
C -3 dB
Ctr -7 dB

Mass-air-mass resonant frequency = =36 Hz

Panel Size = 2.7 m x 4.0 m

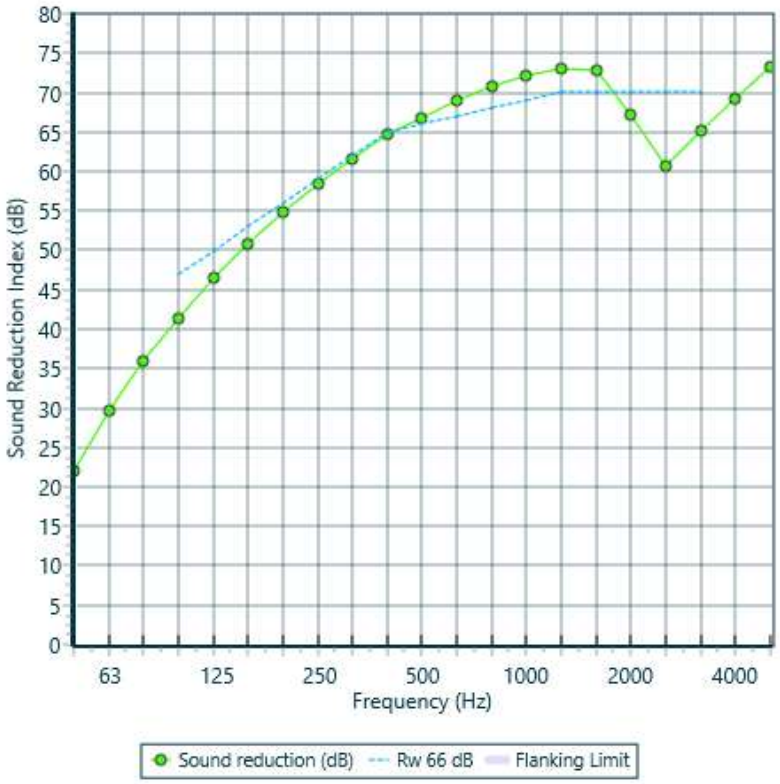
Partition surface mass = 58.1 kg/m²

## System description

Panel 1 : 1 x 1 mm Copper + 1 x 18 mm RCM CemBoard (cement particle board)

Frame: Steel Stud + resil. rail (1.4E2 mm x 38 mm ), Stud spacing 600 mm ; Cavity Width 150 mm , 1 x Fibreglass (10kg/m3) 60mm Thickness 100 mm ...
Panel 2 : 2 x 15 mm Gyproc SoundBloc 15mm

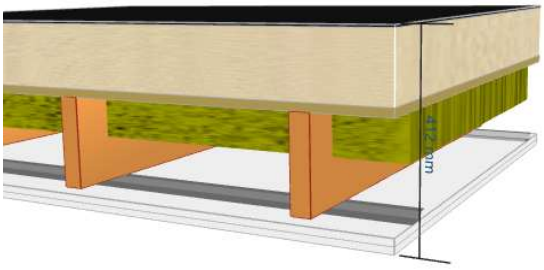
| freq.(Hz) | R(dB) | R(dB) |
|---|---|---|
| 50 | 22 | |
| 63 | 30 | 26 |
| 80 | 36 | |
| 100 | 41 | |
| 125 | 46 | 45 |
| 160 | 51 | |
| 200 | 55 | |
| 250 | 58 | 57 |
| 315 | 62 | |
| 400 | 65 | |
| 500 | 67 | 66 |
| 630 | 69 | |
| 800 | 71 | |
| 1000 | 72 | 72 |
| 1250 | 73 | |
| 1600 | 73 | |
| 2000 | 67 | 64 |
| 2500 | 61 | |
| 3150 | 65 | |
| 4000 | 69 | 68 |
| 5000 | 73 | |



# Sound Insulation Prediction (v9.0.24)


Margin of error is generally within Rw ±3 dB
- Key No. 2501
Job Name: 52 Coldharbour Lane
Job No.: 104753 Initials:AD
Date:03/06/2025
File Name:Insul third floor roof.ixl

Notes:Third floor roof



**Rw 64 dB**
C -1 dB
Ctr -5 dB

Mass-air-mass resonant frequency = =28 Hz

Panel Size = 2.7 m x 4.0 m

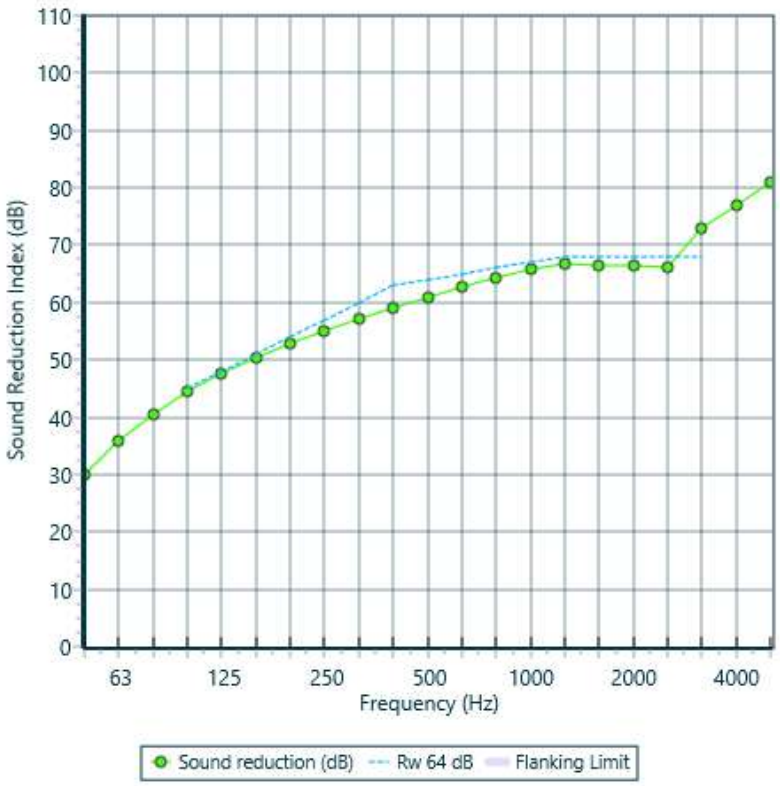
Partition surface mass = 67.8 kg/m²

## System description

Panel 1 : 1 x 4 mm Nuraply waterproof membrane + 1 x 139.9 mm Kingspan KS 1000AWP 120/140mm
+ 1 x 18 mm RCM CemBoard (cement particle board)

Frame: Solid Joist with resilient rail (2E2 mm x 45 mm ), Stud spacing 600 mm ; Cavity Width 220 mm , 1 x Fibreglass (10kg/m3) 60mm Thickness 100 mm ...
Panel 2 : 2 x 15 mm Gyproc SoundBloc 15mm

| freq.(Hz) | R(dB) | R(dB) |
|---|---|---|
| 50 | 30 | |
| 63 | 36 | 34 |
| 80 | 41 | |
| 100 | 44 | |
| 125 | 48 | 47 |
| 160 | 50 | |
| 200 | 53 | |
| 250 | 55 | 55 |
| 315 | 57 | |
| 400 | 59 | |
| 500 | 61 | 61 |
| 630 | 63 | |
| 800 | 64 | |
| 1000 | 66 | 66 |
| 1250 | 67 | |
| 1600 | 66 | |
| 2000 | 67 | 66 |
| 2500 | 66 | |
| 3150 | 73 | |
| 4000 | 77 | 76 |
| 5000 | 81 | |



# Appendix B

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Front | $L_{eq,ff}$ | 65dBA | 67 | 64 | 61 | 61 | 58 | 52 |
| 2no. Passsive ventilators MA3051 | $D_{ne,w}$ | Dne,w 55dB | 50 | 48 | 51 | 56 | 67 | 68 |
| Glazing 8mm float / 10mm / 6mm float | $R_w$ | Rw 35dB | 30 | 27 | 29 | 38 | 35 | 35 |
| External wall | $R_{ew}$ | $R_w$ 52 dB | 39 | 37 | 42 | 52 | 62 | 73 |
| Roof | $R_{rr}$ | $R_w$ n/a dB | 100 | 100 | 100 | 100 | 100 | 100 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.8 | 13 | 15 | 17 | 17 | 16 | 16 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 33 |
| Window area | $S_{wi}$ | 10 |
| $S_f - S_{wi}$ | $S_{ew}$ | 23 |
| Area of ceiling | $S_{rr}$ | 33 |
| $S_f + S_{rr}$ | S | 66 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 82 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 67 | 64 | 61 | 61 | 58 | 52 |
| 2no. Passsive ventilators MA3051 | $D_{n,e}$ | | 49.76091259 | 47.76091259 | 50.76091259 | 55.76091259 | 66.76091259 | 67.76091259 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Double Glazed Windows | $R_{wi}$ | | 30 | 27 | 29 | 38 | 35 | 35 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00016 | 0.00031 | 0.00020 | 0.00002 | 0.00005 | 0.00005 |
| External Wall Construction | $R_{ew}$ | | 39 | 37 | 42 | 52 | 62 | 73 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00004 | 0.00007 | 0.00002 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 100 | 100 | 100 | 100 | 100 | 100 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -37 | -34 | -37 | -46 | -43 | -43 |
| Total Absorption Area of Receiver Room | A (furnished) | | 13 | 15 | 17 | 17 | 16 | 16 |
| | 10Log(S/A) | G | 7.2 | 6.5 | 6.0 | 6.0 | 6.2 | 6.2 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 40.5 | 39.9 | 33.6 | 24.4 | 23.8 | 17.7 |

| **RESULTANT INTERNAL NOISE LEVEL** | **35** |
|---|---|

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Front | $L_{eq,ff}$ | 65dBA | 67 | 64 | 61 | 61 | 58 | 52 |
| Passsive ventilation MA3051 | $D_{ne,w}$ | Dne,w 55dB | 53 | 51 | 54 | 59 | 70 | 71 |
| Glazing 8mm float / 10mm / 6mm float | $R_w$ | Rw 35dB | 30 | 27 | 29 | 38 | 35 | 35 |
| External wall | $R_{ew}$ | $R_w$ 52 dB | 39 | 37 | 42 | 52 | 62 | 73 |
| Roof | $R_{rr}$ | $R_w$ n/a dB | 100 | 100 | 100 | 100 | 100 | 100 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.5 | 7 | 9 | 11 | 11 | 10 | 10 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 11 |
| Window area | $S_{wi}$ | 4 |
| $S_f - S_{wi}$ | $S_{ew}$ | 7 |
| Area of ceiling | $S_{rr}$ | 13 |
| $S_f + S_{rr}$ | S | 24 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 33 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 67 | 64 | 61 | 61 | 58 | 52 |
| Passsive ventilation MA3051 | $D_{n,e}$ | | 52.77121255 | 50.77121255 | 53.77121255 | 58.77121255 | 69.77121255 | 70.77121255 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Double Glazed Windows | $R_{wi}$ | | 30 | 27 | 29 | 38 | 35 | 35 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00015 | 0.00030 | 0.00019 | 0.00002 | 0.00005 | 0.00005 |
| External Wall Construction | $R_{ew}$ | | 39 | 37 | 42 | 52 | 62 | 73 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00004 | 0.00006 | 0.00002 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 100 | 100 | 100 | 100 | 100 | 100 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -37 | -34 | -37 | -46 | -43 | -43 |
| Total Absorption Area of Receiver Room | A (furnished) | | 7 | 9 | 11 | 11 | 10 | 10 |
| | 10Log(S/A) | G | 5.5 | 4.4 | 3.5 | 3.5 | 3.9 | 3.9 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 38.6 | 37.5 | 30.9 | 21.7 | 21.3 | 15.2 |

| **RESULTANT INTERNAL NOISE LEVEL** | **33** |
|---|---|

## 01 F.3 Bedroom f night

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Front | $L_{eq,ff}$ | 63dBA | 65 | 62 | 58 | 60 | 56 | 49 |
| Passsive ventilation MA3051 | $D_{ne,w}$ | Dne,w 55dB | 53 | 51 | 54 | 59 | 70 | 71 |
| Glazing 8mm float / 10mm / 6mm float | $R_w$ | Rw 35dB | 30 | 27 | 29 | 38 | 35 | 35 |
| External wall | $R_{ew}$ | $R_w$ 52 dB | 39 | 37 | 42 | 52 | 62 | 73 |
| Roof | $R_{rr}$ | $R_w$ n/a dB | 100 | 100 | 100 | 100 | 100 | 100 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.5 | 7 | 9 | 11 | 11 | 10 | 10 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 11 |
| Window area | $S_{wi}$ | 4 |
| $S_f - S_{wi}$ | $S_{ew}$ | 7 |
| Area of ceiling | $S_{rr}$ | 13 |
| $S_f + S_{rr}$ | S | 24 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 33 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 65 | 62 | 58 | 60 | 56 | 49 |
| Passsive ventilation MA3051 | $D_{n,e}$ | | 52.77121255 | 50.77121255 | 53.77121255 | 58.77121255 | 69.77121255 | 70.77121255 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Double Glazed Windows | $R_{wi}$ | | 30 | 27 | 29 | 38 | 35 | 35 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00015 | 0.00030 | 0.00019 | 0.00002 | 0.00005 | 0.00005 |
| External Wall Construction | $R_{ew}$ | | 39 | 37 | 42 | 52 | 62 | 73 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00004 | 0.00006 | 0.00002 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 100 | 100 | 100 | 100 | 100 | 100 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -37 | -34 | -37 | -46 | -43 | -43 |
| Total Absorption Area of Receiver Room | A (furnished) | | 7 | 9 | 11 | 11 | 10 | 10 |
| | 10Log(S/A) | G | 5.5 | 4.4 | 3.5 | 3.5 | 3.9 | 3.9 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 36.0 | 35.0 | 27.7 | 20.6 | 19.7 | 12.2 |

| **RESULTANT INTERNAL NOISE LEVEL** | **30** |
|---|---|

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Front | $Lmax_{,ff}$ | 80dBA | 72 | 69 | 76 | 79 | 67 | 62 |
| Passsive ventilation MA3051 | $D_{ne,w}$ | Dne,w 55dB | 53 | 51 | 54 | 59 | 70 | 71 |
| Glazing 8mm float / 10mm / 6mm float | $R_w$ | Rw 35dB | 30 | 27 | 29 | 38 | 35 | 35 |
| External wall | $R_{ew}$ | $R_w$ 52 dB | 39 | 37 | 42 | 52 | 62 | 73 |
| Roof | $R_{rr}$ | $R_w$ n/a dB | 100 | 100 | 100 | 100 | 100 | 100 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.5 | 7 | 9 | 11 | 11 | 10 | 10 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 11 |
| Window area | $S_{wi}$ | 4 |
| $S_f - S_{wi}$ | $S_{ew}$ | 7 |
| Area of ceiling | $S_{rr}$ | 13 |
| $S_f + S_{rr}$ | S | 24 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 33 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 72 | 69 | 76 | 79 | 67 | 62 |
| Passsive ventilation MA3051 | $D_{n,e}$ | | 52.77121255 | 50.77121255 | 53.77121255 | 58.77121255 | 69.77121255 | 70.77121255 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Double Glazed Windows | $R_{wi}$ | | 30 | 27 | 29 | 38 | 35 | 35 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00015 | 0.00030 | 0.00019 | 0.00002 | 0.00005 | 0.00005 |
| External Wall Construction | $R_{ew}$ | | 39 | 37 | 42 | 52 | 62 | 73 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00004 | 0.00006 | 0.00002 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 100 | 100 | 100 | 100 | 100 | 100 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -37 | -34 | -37 | -46 | -43 | -43 |
| Total Absorption Area of Receiver Room | A (furnished) | | 7 | 9 | 11 | 11 | 10 | 10 |
| | 10Log(S/A) | G | 5.5 | 4.4 | 3.5 | 3.5 | 3.9 | 3.9 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 43.7 | 42.2 | 46.0 | 39.4 | 30.8 | 25.3 |

| **RESULTANT INTERNAL NOISE LEVEL** | **45** |
|---|---|

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Rear | $L_{eq,ff}$ | 56dBA | 59 | 56 | 51 | 52 | 47 | 39 |
| 2no. Simon Acoustic frame ventilators | $D_{ne,w}$ | Dne,w 33dB | 36 | 33 | 32 | 28 | 29 | 34 |
| Glazing 6mm float / 10mm / 4mm float | $R_w$ | Rw 34dB | 27 | 26 | 28 | 37 | 36 | 36 |
| External wall | $R_{ew}$ | $R_w$ 52 dB | 39 | 37 | 42 | 52 | 62 | 73 |
| Roof | $R_{rr}$ | $R_w$ n/a dB | 100 | 100 | 100 | 100 | 100 | 100 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.8 | 9 | 11 | 13 | 13 | 12 | 12 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 27 |
| Window area | $S_{wi}$ | 4 |
| $S_f - S_{wi}$ | $S_{ew}$ | 23 |
| Area of ceiling | $S_{rr}$ | 25 |
| $S_f + S_{rr}$ | S | 52 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 63 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 59 | 56 | 51 | 52 | 47 | 39 |
| 2no. Simon Acoustic frame ventilators | $D_{n,e}$ | | 36.48970004 | 32.88970004 | 32.08970004 | 27.68970004 | 29.08970004 | 33.88970004 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00004 | 0.00010 | 0.00012 | 0.00033 | 0.00024 | 0.00008 |
| Double Glazed Windows | $R_{wi}$ | | 27 | 26 | 28 | 37 | 36 | 36 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00016 | 0.00020 | 0.00013 | 0.00002 | 0.00002 | 0.00002 |
| External Wall Construction | $R_{ew}$ | | 39 | 37 | 42 | 52 | 62 | 73 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00006 | 0.00009 | 0.00003 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 100 | 100 | 100 | 100 | 100 | 100 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -36 | -34 | -36 | -35 | -36 | -40 |
| Total Absorption Area of Receiver Room | A (furnished) | | 9 | 11 | 13 | 13 | 12 | 12 |
| | 10Log(S/A) | G | 7.8 | 6.9 | 6.1 | 6.1 | 6.5 | 6.5 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 34.1 | 31.5 | 24.9 | 26.5 | 20.4 | 8.6 |

| **RESULTANT INTERNAL NOISE LEVEL** | **30** |
|---|---|

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Rear | $L_{eq,ff}$ | 56dBA | 59 | 56 | 51 | 52 | 47 | 39 |
| Simon Acoustic frame ventilator | $D_{ne,w}$ | Dne,w 33dB | 40 | 36 | 35 | 31 | 32 | 37 |
| Glazing 6mm float / 10mm / 4mm float | $R_w$ | Rw 34dB | 27 | 26 | 28 | 37 | 36 | 36 |
| External wall | $R_{ew}$ | $R_w$ 52 dB | 39 | 37 | 42 | 52 | 62 | 73 |
| Roof | $R_{rr}$ | $R_w$ n/a dB | 100 | 100 | 100 | 100 | 100 | 100 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.5 | 7 | 9 | 11 | 11 | 10 | 10 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 12 |
| Window area | $S_{wi}$ | 2 |
| $S_f - S_{wi}$ | $S_{ew}$ | 10 |
| Area of ceiling | $S_{rr}$ | 13 |
| $S_f + S_{rr}$ | S | 26 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 33 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 59 | 56 | 51 | 52 | 47 | 39 |
| Simon Acoustic frame ventilator | $D_{n,e}$ | | 39.5 | 35.9 | 35.1 | 30.7 | 32.1 | 36.9 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00004 | 0.00010 | 0.00012 | 0.00033 | 0.00024 | 0.00008 |
| Double Glazed Windows | $R_{wi}$ | | 27 | 26 | 28 | 37 | 36 | 36 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00016 | 0.00021 | 0.00013 | 0.00002 | 0.00002 | 0.00002 |
| External Wall Construction | $R_{ew}$ | | 39 | 37 | 42 | 52 | 62 | 73 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00005 | 0.00008 | 0.00003 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 100 | 100 | 100 | 100 | 100 | 100 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -36 | -34 | -36 | -35 | -36 | -40 |
| Total Absorption Area of Receiver Room | A (furnished) | | 7 | 9 | 11 | 11 | 10 | 10 |
| | 10Log(S/A) | G | 5.7 | 4.6 | 3.7 | 3.7 | 4.1 | 4.1 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 32.0 | 29.3 | 22.5 | 24.2 | 18.2 | 6.4 |

| **RESULTANT INTERNAL NOISE LEVEL** | **28** |
|---|---|

## 01 F.1 Bedroom r night

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Rear | $L_{eq,ff}$ | 54dBA | 57 | 53 | 48 | 51 | 44 | 35 |
| Simon Acoustic frame ventilator | $D_{ne,w}$ | Dne,w 33dB | 40 | 36 | 35 | 31 | 32 | 37 |
| Glazing 6mm float / 10mm / 4mm float | $R_w$ | Rw 34dB | 27 | 26 | 28 | 37 | 36 | 36 |
| External wall | $R_{ew}$ | $R_w$ 52 dB | 39 | 37 | 42 | 52 | 62 | 73 |
| Roof | $R_{rr}$ | $R_w$ n/a dB | 100 | 100 | 100 | 100 | 100 | 100 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.5 | 7 | 9 | 11 | 11 | 10 | 10 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 12 |
| Window area | $S_{wi}$ | 2 |
| $S_f - S_{wi}$ | $S_{ew}$ | 10 |
| Area of ceiling | $S_{rr}$ | 13 |
| $S_f + S_{rr}$ | S | 26 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 33 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 57 | 53 | 48 | 51 | 44 | 35 |
| Simon Acoustic frame ventilator | $D_{n,e}$ | | 39.5 | 35.9 | 35.1 | 30.7 | 32.1 | 36.9 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00004 | 0.00010 | 0.00012 | 0.00033 | 0.00024 | 0.00008 |
| Double Glazed Windows | $R_{wi}$ | | 27 | 26 | 28 | 37 | 36 | 36 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00016 | 0.00021 | 0.00013 | 0.00002 | 0.00002 | 0.00002 |
| External Wall Construction | $R_{ew}$ | | 39 | 37 | 42 | 52 | 62 | 73 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00005 | 0.00008 | 0.00003 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 100 | 100 | 100 | 100 | 100 | 100 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -36 | -34 | -36 | -35 | -36 | -40 |
| Total Absorption Area of Receiver Room | A (furnished) | | 7 | 9 | 11 | 11 | 10 | 10 |
| | 10Log(S/A) | G | 5.7 | 4.6 | 3.7 | 3.7 | 4.1 | 4.1 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 29.5 | 26.8 | 19.6 | 22.9 | 15.7 | 2.0 |

| **RESULTANT INTERNAL NOISE LEVEL** | **26** |
|---|---|

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Rear | $Lmax_{,ff}$ | 72dBA | 70 | 68 | 63 | 70 | 63 | 54 |
| Simon Acoustic frame ventilator | $D_{ne,w}$ | Dne,w 33dB | 40 | 36 | 35 | 31 | 32 | 37 |
| Glazing 6mm float / 10mm / 4mm float | $R_w$ | Rw 34dB | 27 | 26 | 28 | 37 | 36 | 36 |
| External wall | $R_{ew}$ | $R_w$ 52 dB | 39 | 37 | 42 | 52 | 62 | 73 |
| Roof | $R_{rr}$ | $R_w$ n/a dB | 100 | 100 | 100 | 100 | 100 | 100 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.5 | 7 | 9 | 11 | 11 | 10 | 10 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 12 |
| Window area | $S_{wi}$ | 2 |
| $S_f - S_{wi}$ | $S_{ew}$ | 10 |
| Area of ceiling | $S_{rr}$ | 13 |
| $S_f + S_{rr}$ | S | 26 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 33 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 70 | 68 | 63 | 70 | 63 | 54 |
| Simon Acoustic frame ventilator | $D_{n,e}$ | | 39.5 | 35.9 | 35.1 | 30.7 | 32.1 | 36.9 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00004 | 0.00010 | 0.00012 | 0.00033 | 0.00024 | 0.00008 |
| Double Glazed Windows | $R_{wi}$ | | 27 | 26 | 28 | 37 | 36 | 36 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00016 | 0.00021 | 0.00013 | 0.00002 | 0.00002 | 0.00002 |
| External Wall Construction | $R_{ew}$ | | 39 | 37 | 42 | 52 | 62 | 73 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00005 | 0.00008 | 0.00003 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 100 | 100 | 100 | 100 | 100 | 100 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -36 | -34 | -36 | -35 | -36 | -40 |
| Total Absorption Area of Receiver Room | A (furnished) | | 7 | 9 | 11 | 11 | 10 | 10 |
| | 10Log(S/A) | G | 5.7 | 4.6 | 3.7 | 3.7 | 4.1 | 4.1 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 42.5 | 41.1 | 34.2 | 42.2 | 34.0 | 21.3 |

| **RESULTANT INTERNAL NOISE LEVEL** | **44** |
|---|---|

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Front | $L_{eq,ff}$ | 65dBA | 67 | 64 | 61 | 61 | 58 | 52 |
| Greenwoods AWV 39 ventilator x2 | $D_{ne,w}$ | Dne,w 39dB | 41 | 38 | 38 | 40 | 49 | 61 |
| Glazing 8mm float / 10mm / 6mm float | $R_w$ | Rw 35dB | 30 | 27 | 29 | 38 | 35 | 35 |
| External wall - Mansard | $R_{ew}$ | $R_w$ 66 dB | 38 | 50 | 59 | 65 | 57 | 61 |
| Roof | $R_{rr}$ | $R_w$ 64 dB | 40 | 48 | 54 | 59 | 59 | 69 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.8 | 10 | 12 | 14 | 14 | 13 | 13 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 29 |
| Window area | $S_{wi}$ | 4 |
| $S_f - S_{wi}$ | $S_{ew}$ | 25 |
| Area of ceiling | $S_{rr}$ | 27 |
| $S_f + S_{rr}$ | S | 56 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 68 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 67 | 64 | 61 | 61 | 58 | 52 |
| Greenwoods AWV 39 ventilator x2 | $D_{n,e}$ | | 40.76091259 | 37.76091259 | 37.76091259 | 39.76091259 | 48.76091259 | 60.76091259 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00002 | 0.00003 | 0.00003 | 0.00002 | 0.00000 | 0.00000 |
| Double Glazed Windows | $R_{wi}$ | | 30 | 27 | 29 | 38 | 35 | 35 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00008 | 0.00015 | 0.00009 | 0.00001 | 0.00002 | 0.00002 |
| External Wall Construction | $R_{ew}$ | | 38 | 50 | 59 | 65 | 57 | 61 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00007 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 40 | 48 | 54 | 59 | 59 | 69 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00005 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -37 | -37 | -39 | -45 | -46 | -46 |
| Total Absorption Area of Receiver Room | A (furnished) | | 10 | 12 | 14 | 14 | 13 | 13 |
| | 10Log(S/A) | G | 7.6 | 6.8 | 6.1 | 6.1 | 6.4 | 6.4 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 41.1 | 37.1 | 31.3 | 25.1 | 21.5 | 14.8 |

| **RESULTANT INTERNAL NOISE LEVEL** | **33** |
|---|---|

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Front | $L_{eq,ff}$ | 65dBA | 67 | 64 | 61 | 61 | 58 | 52 |
| Greenwoods AWV 39 ventilator | $D_{ne,w}$ | Dne,w 39dB | 44 | 41 | 41 | 43 | 52 | 64 |
| Glazing 8mm float / 10mm / 6mm float | $R_w$ | Rw 35dB | 30 | 27 | 29 | 38 | 35 | 35 |
| External wall - Mansard | $R_{ew}$ | $R_w$ 66 dB | 38 | 50 | 59 | 65 | 57 | 61 |
| Roof | $R_{rr}$ | $R_w$ 64 dB | 40 | 48 | 54 | 59 | 59 | 69 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.5 | 16 | 18 | 20 | 20 | 19 | 19 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 26 |
| Window area | $S_{wi}$ | 3 |
| $S_f - S_{wi}$ | $S_{ew}$ | 23 |
| Area of ceiling | $S_{rr}$ | 24 |
| $S_f + S_{rr}$ | S | 50 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 61 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 67 | 64 | 61 | 61 | 58 | 52 |
| Greenwoods AWV 39 ventilator | $D_{n,e}$ | | 43.77121255 | 40.77121255 | 40.77121255 | 42.77121255 | 51.77121255 | 63.77121255 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00001 | 0.00002 | 0.00002 | 0.00001 | 0.00000 | 0.00000 |
| Double Glazed Windows | $R_{wi}$ | | 30 | 27 | 29 | 38 | 35 | 35 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00006 | 0.00013 | 0.00008 | 0.00001 | 0.00002 | 0.00002 |
| External Wall Construction | $R_{ew}$ | | 38 | 50 | 59 | 65 | 57 | 61 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00007 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 40 | 48 | 54 | 59 | 59 | 69 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00005 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -37 | -38 | -40 | -47 | -46 | -47 |
| Total Absorption Area of Receiver Room | A (furnished) | | 16 | 18 | 20 | 20 | 19 | 19 |
| | 10Log(S/A) | G | 5.0 | 4.5 | 4.0 | 4.0 | 4.3 | 4.3 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 38.2 | 33.9 | 28.2 | 21.4 | 18.5 | 11.9 |

| **RESULTANT INTERNAL NOISE LEVEL** | **30** |
|---|---|

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Front | $L_{eq,ff}$ | 63dBA | 65 | 62 | 58 | 60 | 56 | 49 |
| Greenwoods AWV 39 ventilator | $D_{ne,w}$ | Dne,w 39dB | 44 | 41 | 41 | 43 | 52 | 64 |
| Glazing 8mm float / 10mm / 6mm float | $R_w$ | Rw 35dB | 30 | 27 | 29 | 38 | 35 | 35 |
| External wall - Mansard | $R_{ew}$ | $R_w$ 66 dB | 38 | 50 | 59 | 65 | 57 | 61 |
| Roof | $R_{rr}$ | $R_w$ 64 dB | 40 | 48 | 54 | 59 | 59 | 69 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.5 | 16 | 18 | 20 | 20 | 19 | 19 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 26 |
| Window area | $S_{wi}$ | 3 |
| $S_f - S_{wi}$ | $S_{ew}$ | 23 |
| Area of ceiling | $S_{rr}$ | 24 |
| $S_f + S_{rr}$ | S | 50 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 61 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 65 | 62 | 58 | 60 | 56 | 49 |
| Greenwoods AWV 39 ventilator | $D_{n,e}$ | | 43.77121255 | 40.77121255 | 40.77121255 | 42.77121255 | 51.77121255 | 63.77121255 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00001 | 0.00002 | 0.00002 | 0.00001 | 0.00000 | 0.00000 |
| Double Glazed Windows | $R_{wi}$ | | 30 | 27 | 29 | 38 | 35 | 35 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00006 | 0.00013 | 0.00008 | 0.00001 | 0.00002 | 0.00002 |
| External Wall Construction | $R_{ew}$ | | 38 | 50 | 59 | 65 | 57 | 61 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00007 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 40 | 48 | 54 | 59 | 59 | 69 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00005 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -37 | -38 | -40 | -47 | -46 | -47 |
| Total Absorption Area of Receiver Room | A (furnished) | | 16 | 18 | 20 | 20 | 19 | 19 |
| | 10Log(S/A) | G | 5.0 | 4.5 | 4.0 | 4.0 | 4.3 | 4.3 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 35.6 | 31.4 | 25.0 | 20.2 | 16.9 | 8.9 |

| **RESULTANT INTERNAL NOISE LEVEL** | **28** |
|---|---|

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Front | $Lmax_{,ff}$ | 80dBA | 72 | 69 | 76 | 79 | 67 | 62 |
| Greenwoods AWV 39 ventilator | $D_{ne,w}$ | Dne,w 39dB | 44 | 41 | 41 | 43 | 52 | 64 |
| Glazing 8mm float / 10mm / 6mm float | $R_w$ | Rw 35dB | 30 | 27 | 29 | 38 | 35 | 35 |
| External wall - Mansard | $R_{ew}$ | $R_w$ 66 dB | 38 | 50 | 59 | 65 | 57 | 61 |
| Roof | $R_{rr}$ | $R_w$ 64 dB | 40 | 48 | 54 | 59 | 59 | 69 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.5 | 16 | 18 | 20 | 20 | 19 | 19 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 26 |
| Window area | $S_{wi}$ | 3 |
| $S_f - S_{wi}$ | $S_{ew}$ | 23 |
| Area of ceiling | $S_{rr}$ | 24 |
| $S_f + S_{rr}$ | S | 50 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 61 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 72 | 69 | 76 | 79 | 67 | 62 |
| Greenwoods AWV 39 ventilator | $D_{n,e}$ | | 43.77121255 | 40.77121255 | 40.77121255 | 42.77121255 | 51.77121255 | 63.77121255 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00001 | 0.00002 | 0.00002 | 0.00001 | 0.00000 | 0.00000 |
| Double Glazed Windows | $R_{wi}$ | | 30 | 27 | 29 | 38 | 35 | 35 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00006 | 0.00013 | 0.00008 | 0.00001 | 0.00002 | 0.00002 |
| External Wall Construction | $R_{ew}$ | | 38 | 50 | 59 | 65 | 57 | 61 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00007 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 40 | 48 | 54 | 59 | 59 | 69 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00005 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -37 | -38 | -40 | -47 | -46 | -47 |
| Total Absorption Area of Receiver Room | A (furnished) | | 16 | 18 | 20 | 20 | 19 | 19 |
| | 10Log(S/A) | G | 5.0 | 4.5 | 4.0 | 4.0 | 4.3 | 4.3 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 43.2 | 38.6 | 43.3 | 39.0 | 27.9 | 22.1 |

| **RESULTANT INTERNAL NOISE LEVEL** | **43** |
|---|---|

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Rear | $L_{eq,ff}$ | 56dBA | 59 | 56 | 51 | 52 | 47 | 39 |
| Simon Acoustic frame ventilator | $D_{ne,w}$ | Dne,w 33dB | 40 | 36 | 35 | 31 | 32 | 37 |
| Glazing 6mm float / 10mm / 4mm float | $R_w$ | Rw 34dB | 27 | 26 | 28 | 37 | 36 | 36 |
| External wall - Mansard | $R_{ew}$ | $R_w$ 66 dB | 38 | 50 | 59 | 65 | 57 | 61 |
| Roof | $R_{rr}$ | $R_w$ 64 dB | 40 | 48 | 54 | 59 | 59 | 69 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.5 | 13 | 15 | 17 | 17 | 16 | 16 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 23 |
| Window area | $S_{wi}$ | 4 |
| $S_f - S_{wi}$ | $S_{ew}$ | 20 |
| Area of ceiling | $S_{rr}$ | 21 |
| $S_f + S_{rr}$ | S | 44 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 52 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 59 | 56 | 51 | 52 | 47 | 39 |
| Simon Acoustic frame ventilator | $D_{n,e}$ | | 39.5 | 35.9 | 35.1 | 30.7 | 32.1 | 36.9 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00003 | 0.00006 | 0.00007 | 0.00019 | 0.00014 | 0.00005 |
| Double Glazed Windows | $R_{wi}$ | | 27 | 26 | 28 | 37 | 36 | 36 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00016 | 0.00020 | 0.00013 | 0.00002 | 0.00002 | 0.00002 |
| External Wall Construction | $R_{ew}$ | | 38 | 50 | 59 | 65 | 57 | 61 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00007 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 40 | 48 | 54 | 59 | 59 | 69 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00005 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -35 | -36 | -37 | -37 | -38 | -42 |
| Total Absorption Area of Receiver Room | A (furnished) | | 13 | 15 | 17 | 17 | 16 | 16 |
| | 10Log(S/A) | G | 5.3 | 4.7 | 4.1 | 4.1 | 4.4 | 4.4 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 32.3 | 27.9 | 21.6 | 22.4 | 16.3 | 4.9 |

| **RESULTANT INTERNAL NOISE LEVEL** | **26** |
|---|---|

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Rear | $L_{eq,ff}$ | 54dBA | 57 | 53 | 48 | 51 | 44 | 35 |
| Simon Acoustic frame ventilator | $D_{ne,w}$ | Dne,w 33dB | 40 | 36 | 35 | 31 | 32 | 37 |
| Glazing 6mm float / 10mm / 4mm float | $R_w$ | Rw 34dB | 27 | 26 | 28 | 37 | 36 | 36 |
| External wall - Mansard | $R_{ew}$ | $R_w$ 66 dB | 38 | 50 | 59 | 65 | 57 | 61 |
| Roof | $R_{rr}$ | $R_w$ 64 dB | 40 | 48 | 54 | 59 | 59 | 69 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.5 | 13 | 15 | 17 | 17 | 16 | 16 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 23 |
| Window area | $S_{wi}$ | 4 |
| $S_f - S_{wi}$ | $S_{ew}$ | 20 |
| Area of ceiling | $S_{rr}$ | 21 |
| $S_f + S_{rr}$ | S | 44 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 52 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 57 | 53 | 48 | 51 | 44 | 35 |
| Simon Acoustic frame ventilator | $D_{n,e}$ | | 39.5 | 35.9 | 35.1 | 30.7 | 32.1 | 36.9 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00003 | 0.00006 | 0.00007 | 0.00019 | 0.00014 | 0.00005 |
| Double Glazed Windows | $R_{wi}$ | | 27 | 26 | 28 | 37 | 36 | 36 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00016 | 0.00020 | 0.00013 | 0.00002 | 0.00002 | 0.00002 |
| External Wall Construction | $R_{ew}$ | | 38 | 50 | 59 | 65 | 57 | 61 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00007 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 40 | 48 | 54 | 59 | 59 | 69 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00005 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -35 | -36 | -37 | -37 | -38 | -42 |
| Total Absorption Area of Receiver Room | A (furnished) | | 13 | 15 | 17 | 17 | 16 | 16 |
| | 10Log(S/A) | G | 5.3 | 4.7 | 4.1 | 4.1 | 4.4 | 4.4 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 29.8 | 25.4 | 18.6 | 21.1 | 13.8 | 0.5 |

| | |
|---|---|
| **RESULTANT INTERNAL NOISE LEVEL** | **24** |

ACOUSTICS PLUS

| Description | Term | Weighted rating | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level - Rear | $Lmax_{,ff}$ | 72dBA | 70 | 68 | 63 | 70 | 63 | 54 |
| Simon Acoustic frame ventilator | $D_{ne,w}$ | Dne,w 33dB | 40 | 36 | 35 | 31 | 32 | 37 |
| Glazing 6mm float / 10mm / 4mm float | $R_w$ | Rw 34dB | 27 | 26 | 28 | 37 | 36 | 36 |
| External wall - Mansard | $R_{ew}$ | $R_w$ 66 dB | 38 | 50 | 59 | 65 | 57 | 61 |
| Roof | $R_{rr}$ | $R_w$ 64 dB | 40 | 48 | 54 | 59 | 59 | 69 |
| Total room absorption (based on RT) | $RT_{60}$ | 0.5 | 13 | 15 | 17 | 17 | 16 | 16 |

| Derivation | Term | Value |
|---|---|---|
| Façade area (including window) | $S_f$ | 23 |
| Window area | $S_{wi}$ | 4 |
| $S_f - S_{wi}$ | $S_{ew}$ | 20 |
| Area of ceiling | $S_{rr}$ | 21 |
| $S_f + S_{rr}$ | S | 44 |
| Reference absorption area | $A_0$ | 10 |
| Room volume | V | 52 |

| Description | Term from Equation | Reference letter | Octave Band Centre Frequency (Hz) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Freefield External Noise Level | $L_{eq,ff}$ | A | 70 | 68 | 63 | 70 | 63 | 54 |
| Simon Acoustic frame ventilator | $D_{n,e}$ | | 39.5 | 35.9 | 35.1 | 30.7 | 32.1 | 36.9 |
| | $(A_0/S)*10^{(-D_{ne,w}/10)}$ | B | 0.00003 | 0.00006 | 0.00007 | 0.00019 | 0.00014 | 0.00005 |
| Double Glazed Windows | $R_{wi}$ | | 27 | 26 | 28 | 37 | 36 | 36 |
| | $(S_{wi}/S)*10^{(-R_{wi}/10)}$ | C | 0.00016 | 0.00020 | 0.00013 | 0.00002 | 0.00002 | 0.00002 |
| External Wall Construction | $R_{ew}$ | | 38 | 50 | 59 | 65 | 57 | 61 |
| | $(S_{ew}/S)*10^{(-R_{ew}/10)}$ | D | 0.00007 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Roof Construction | $R_{rr}$ | | 40 | 48 | 54 | 59 | 59 | 69 |
| | $(S_{rr}/S)*10^{(-R_{rr}/10)}$ | E | 0.00005 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| Total Sound Insulation Performance | 10Log(B+C+D+E) | F | -35 | -36 | -37 | -37 | -38 | -42 |
| Total Absorption Area of Receiver Room | A (furnished) | | 13 | 15 | 17 | 17 | 16 | 16 |
| | 10Log(S/A) | G | 5.3 | 4.7 | 4.1 | 4.1 | 4.4 | 4.4 |
| Total Internal Sound Pressure Level, Leq | Leq,2 | A+F+G+3 | 42.9 | 39.7 | 33.3 | 40.4 | 32.2 | 19.8 |

| | |
|---|---|
| **RESULTANT INTERNAL NOISE LEVEL** | **42** |

# Appendix C

# Acoustic Performance

## Glazing Configuration

**6mm Float Glass**

10mm Cavity

**4mm Float Glass**

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## Sound Reduction Indices

| Frequency, Hz / dB | | | | | | Rw | C | Ctr | OITC | STC |
|---|---|---|---|---|---|---|---|---|---|---|
| 125 | 250 | 500 | 1000 | 2000 | 4000 | 34 | -1 | -3 | 29 | 34 |
| 27 | 26 | 28 | 37 | 36 | 29 | | | | | |



Friday, September 29, 2023 | Acoustic database 20210629

# Acoustic Performance

## Glazing Configuration

**8mm Float Glass**

10mm Cavity

**6mm Float Glass**

.

## Sound Reduction Indices

| Frequency, Hz / dB* | | | | | | Rw | C | Ctr | OITC | STC |
|---|---|---|---|---|---|---|---|---|---|---|
| 125 | 250 | 500 | 1000 | 2000 | 4000 | 35 | -1 | -3 | 31 | 35 |
| 30 | 27 | 29 | 38 | 35 | 35 | | | | | |

*The values expressed in the frequency table correspond to the central values of the 1/3 octave band



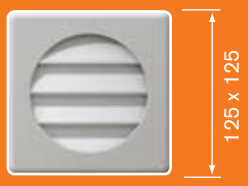
Monday, November 25, 2024 | Acoustic database 20221229

# MA3051

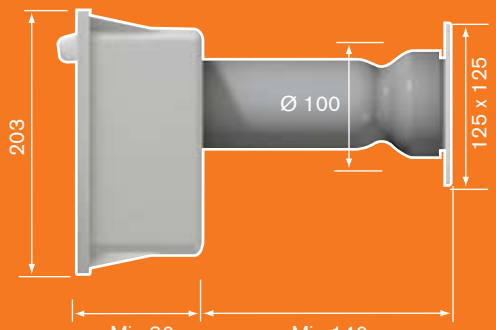
## Acoustic wall ventilator

## Physical specification

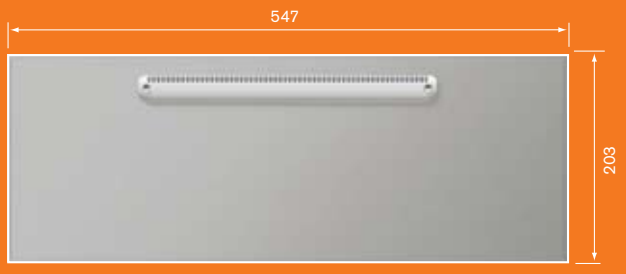
All measurements in millimetres.




**External grille**




**Side**




**Internal**

**Weight:** 2.655 kg
**Materials:** PVC: Casing for wall vent, duct, external grille and internal ventilator. Acoustic lining and material inside wall vent.

## Features

- Acoustic background ventilator
- Provides acoustic attenuation to Dn,e w 55dB
- 2500mm$^2$ equivalent area performance
- Suitable for external wall thicknesses of 140mm and above
- Internal wall constructions of between 100mm and 150mm
- Supplied with internal controllable vent and white/sand external grilles
- Conforms to a acoustic requirements of Noise Insulation Regulations 1975, one of only a small number of products available in the UK

## Controls

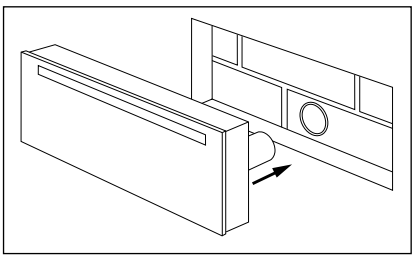
| Model | Operation |
|---|---|
| MA3051 | Internal controllable trickle ventilator |

## Installation

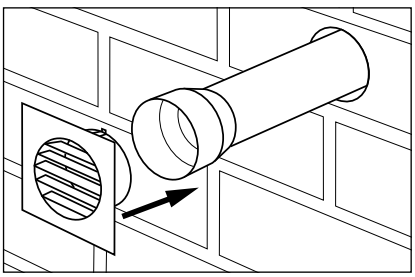
Instructions are provided with product including wall template for cut out.

Bonding compound is required to complete installation.

Protective strip protect internal unit until decoration is complete within dwelling.



Push into cut out in wall

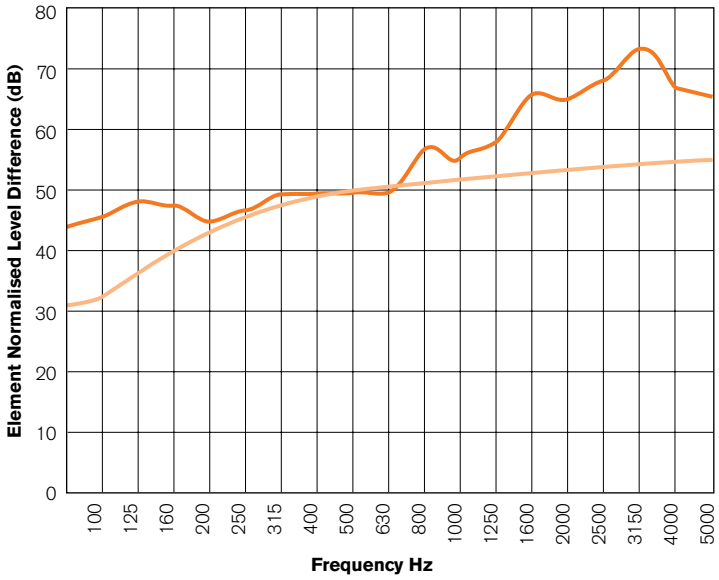


Push fit external grille.

# Acoustic: Ventilation

## Performance

| Model | Acoustic Performance Dn,e W (dB) | Equivalent Area mm² |
|---|---|---|
| MA3051 | 55 | 2500 |




| Frequency | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 |
|---|---|---|---|---|---|---|---|---|
| dB | 45 | 48 | 47 | 44 | 46 | 49 | 49 | 49 |

| Frequency | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3150 |
|---|---|---|---|---|---|---|---|---|
| dB | 49 | 56 | 54 | 57 | 66 | 65 | 68 | 66 |

**Dn,e,w (C;Ctr)** = 55(-1;-3) dB
**C:** Pink Noise
**Ctr:** Road Noise

## Specification

CE MARKED

2 YEAR GUARANTEE

## Considering noise and domestic ventilation together

If life was simple then noise issues would be simply dealt with by swapping standard products for acoustic products.

In some circumstances, this may be achievable, however the nature of acoustic products means that they are generally larger and more bulky and multiple installations, (to achieve higher ventilation rates) of the same product can also effect acoustic performance.

With this in mind, noise and ventilation must be considered together at design. Whole house systems that have limited penetrations in the facade of a building often work well, however a whole range of individual products such as airbricks and wall ventilators are available with db reductions of up to 55.

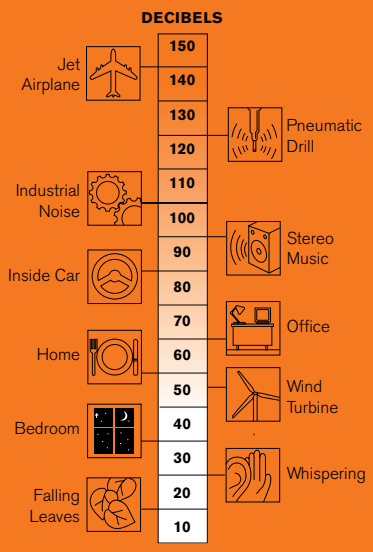
The best thing to do is ask – too many times have buildings been built and then acoustic ventilation been thought about, thus reducing options and sometimes meaning costly re-works on site.

## Measuring sound

Sound can be measured in two ways:

- Intensity/Loudness of sound is measured in decibels – dB
- Pitch of sound is measured in frequency of vibrations per second

The decibel scale runs from the faintest sound the human ear can detect (0dB) to over 180dB that is similar to the noise a rocket creates during a launch.



UKAS ACCREDITATION — INDEPENDENTLY ACCREDITED TEST INFORMATION

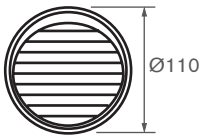
# AWV39

*Acoustic wall ventilator*

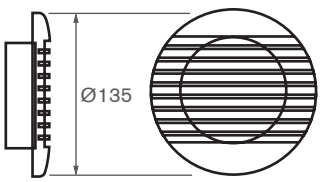
## Physical specification

All measurements in millimetres

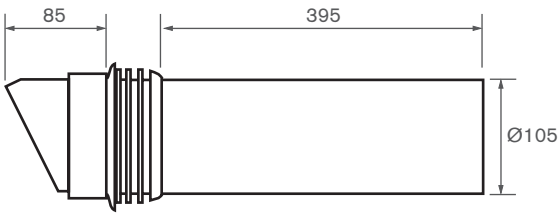
**Weight:** 0.7440kg
**Materials:** PVC




**External grille (supplied separately)**




**Internal**




**Side**

## Features and benefits

Designed for use in refurbishment applications.

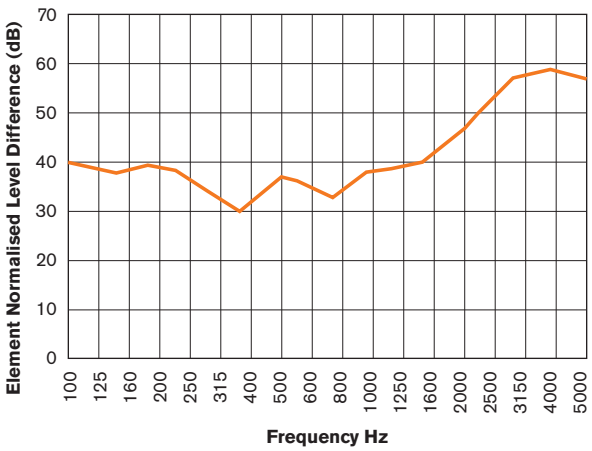
Provides acoustic attenuation to Dn,e,w 39dB.

2500mm² equivalent area performance.

Suitable for wall thicknesses 255–370mm.

## Performance

| Model | Acoustic performance Dn,e,w (dB) | Equivalent area mm² |
|---|---|---|
| AWV39 | 39 | 2500 |



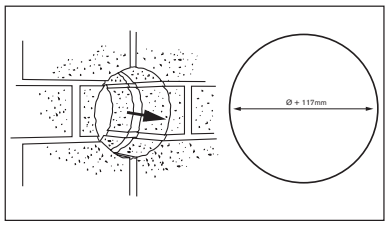

**Key**

AWV39

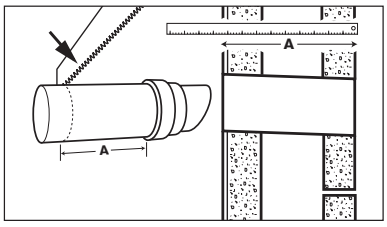
**Acoustic performance**

**Dn,e,w (C;Ctr)** = 39(0;-2) dB
**Dn,e,w (C)** = 39dB
**Dn,e,w (Ctr)** = 37dB
**Dn,e,w:** Average weighted performance across frequency range
**C:** Pink noise
**Ctr:** Road noise

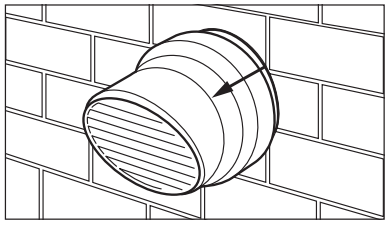
## Installation



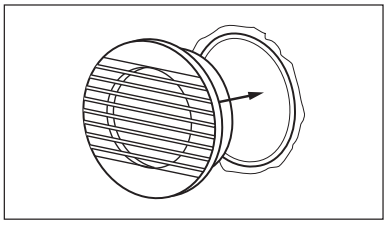

Using a 117mm core drill, cut a hole through wall




Measure wall thickness and cut down plastic sleeve as required



Push the sleeve through the wall. The seal will automatically sit between the sleeve and the external grille, providing a watertight fit



Push fit internal grille

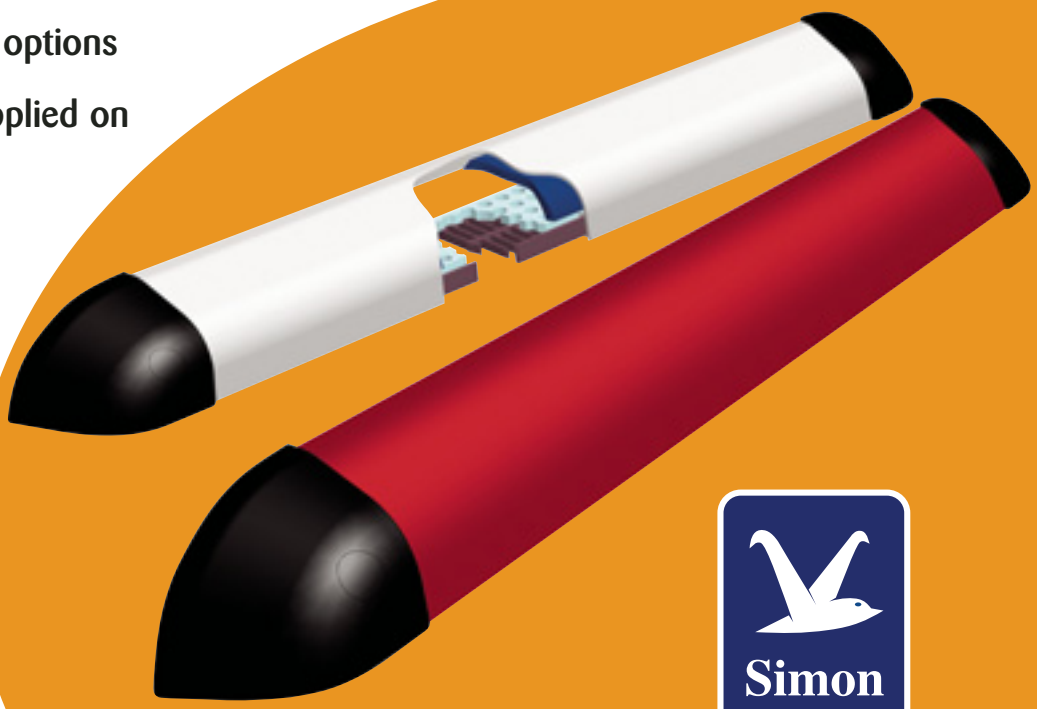
Simon

**Acoustic Solutions** - Simons have launched a range of acoustic ventilators to assist clients in creating a satisfactory solution for all their acoustic requirements. All ventilators in the range meet the requirements of Document F and Document E of the Building Regulations

# Simon Acoustic Ventilators

## Specification

- Sound reduction of up to 41dB
- All models have been independently tested in accordance with BS EN ISO 717-1:1997 ( airborne sound insulation & BS EN 20140-10:1992 )
- Acoustic canopy available in any standard RAL colour and silver anodised finish
- Available in 5 internal options
- All options can be supplied on carrier bar
- Some models available with humidity control
- All models have a minimum Equivalent Area of 2,500$^{mm2}$
- Meets World Health Organisation recommended reduction of 33dB



BVQI ISO 9001

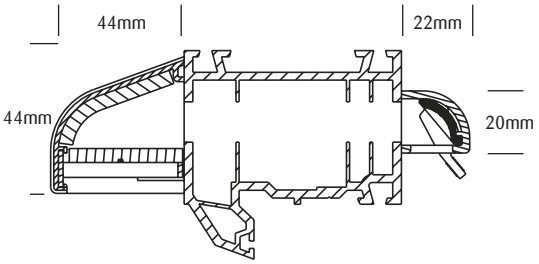
Simon

**Simon**
**Air Management Systems**

**R.W. Simon Limited** System Works, Hatchmoor Industrial Estate, Torrington, Devon EX38 7HP United Kingdom
Tel: 01805 623721 Fax: 01805 624578 E-mail: info@rwsimon.co.uk
**Web: www.rwsimon.co.uk**

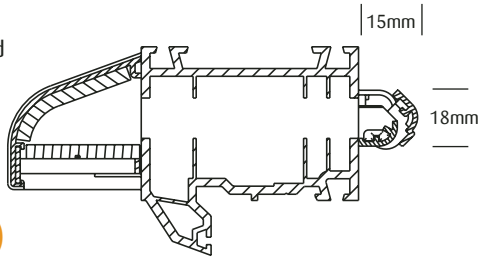
## Simon Acoustic FV ( Framevent )

- Supplied with a PVCu internal flap unit and aluminium external canopy
- 4080$^{mm2}$ measured area 2500$^{mm2}$ Equivalent Area
- Available with white, bright white, mahogany & tan internals and any standard RAL colour or anodised external aluminium canopy
- Achieves sound reduction of 40dB closed and 33dB open
- Rod options available



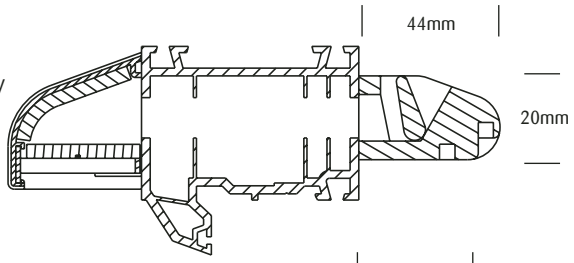

## Simon Acoustic SL ( Slimline )

- Manufactured fully from aluminium. Available in any standard RAL colour, or anodised internal and externals
- 4080$^{mm2}$ measured area 2,500$^{mm2}$ Equivalent Area
- Achieves sound reduction of 39dB closed and 33dB open
- Rod options available



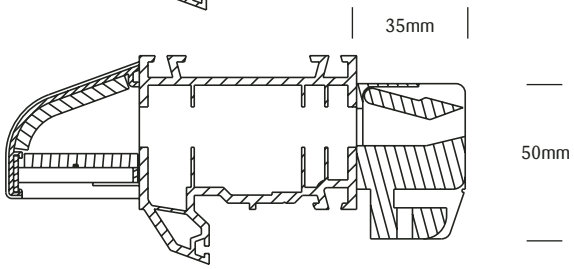

## Simon Acoustic EMM ( Humidity Controlled )

- Internal unit and an aluminium external canopy
- Achieves 2500$^{mm2}$ Equivalent Area
- Available in white internally and any standard. RAL colour or anodised external canopy
- Uses a hygromatic sensor which opens and closes the flap dependent on the amount of moisture in the room
- Achieves sound reduction of 39dB closed and 33dB open



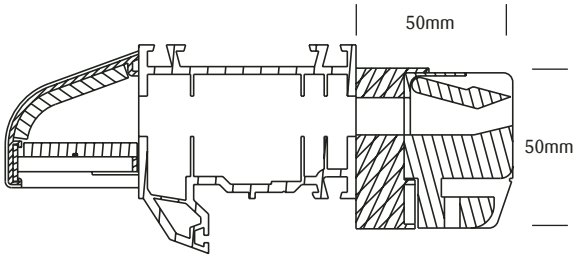

## Simon Acoustic EHA

- Internal automatic opening unit and aluminium external canopy
- Achieves a minimum Equivalent Area of 2500$^{mm2}$
- Available in white internally and any standard RAL colour or anodised external
- Uses a hygromatic sensor which opens and closes the flap dependent on the amount of moisture in the room
- Achieves sound reduction of 38dB closed and 36dB open




## Simon Acoustic EHAS

- Internal automatic opening unit and aluminium external canopy
- Has a minimum Equivalent Area of 2500$^{mm2}$
- Available in white internally and any standard RAL polyester powder coated finish or anodised external canopy
- Uses a hygromatic sensor which opens and closes the flap dependent on the amount of moisture in the room.
- Includes additional acoustic sleeve to increase the acoustic properties
- Achieves sound reduction of 41dB closed and 38dB open




## Specifications

| | dB Closed | dB open | EA to BS 13141-1 | Measured Area $^{mm2}$ | Dimensions Int. | Dimensions Ext | Slot size |
|---|---|---|---|---|---|---|---|
| Simon Acoustic F V | 40 | 33 | 2830 | 4080 | 400 x 20 | 431 x 45 | 340 x 12 |
| Simon Acoustic SL | 39 | 33 | 2967 | 4080 | 375 x 18 | 431 x 45 | 340 x 12 |
| Simon Acoustic EMM | 39 | 33 | 3199 | 4080 | 420 x 30 | 431 x 45 | 340 x 12 |
| Simon Acoustic EHA | 38 | 36 | 2799 | 4080 | 420 x 50 | 431 x 45 | 340 x 12 |
| Simon Acoustic EHAS | 41 | 38 | 2799 | 4080 | 420 x 50 | 431 x 45 | 340 x 12 |

### Internal Colour Options

| | |
|---|---|
| Simon Acoustic FV | White, Brown and Tan |
| Simon Acoustic SL | Any RAL colour and silver anodised |
| Simon Acoustic EMM | White only |
| Simon Acoustic EHA | White only |
| Simon Acoustic EHAS | White only |

**All the above acoustic vents can be supplied on glazed in carrier bar.**

**By adding additional units the acoustic performance may be reduced.**

**R.W. Simon Limited** System Works, Hatchmoor Industrial Estate,
Torrington, Devon EX38 7HP United Kingdom
Tel: 01805 623721 Fax: 01805 624578 E-mail: info@rwsimon.co.uk

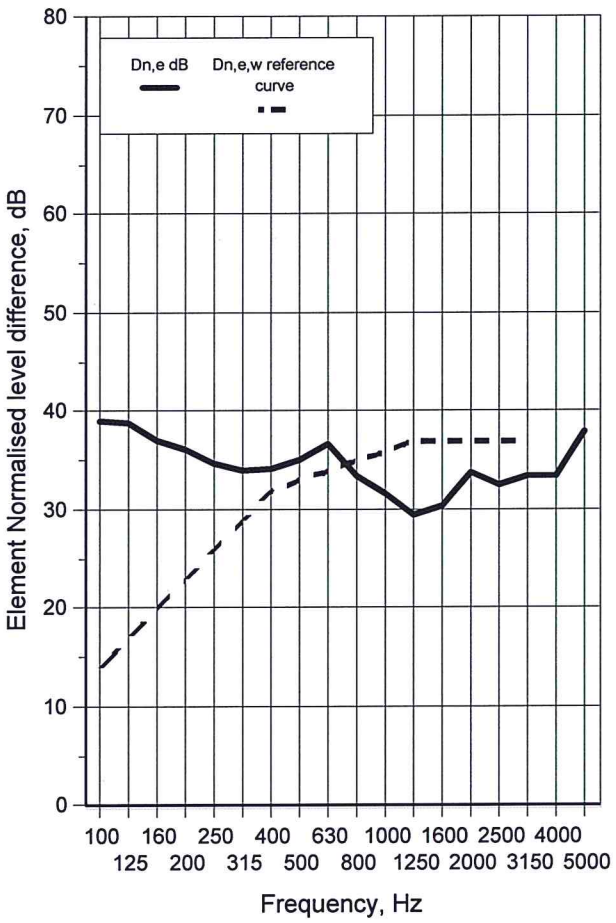
Simon
Air Management Systems

SRL

## Data Sheet 10

| | | | |
|---|---|---|---|
| Test Number: | 12 | Air temperature: | 15.9 °C |
| Test Date: | 16/01/2007 | Air humidity: | 61 % |
| Number of items tested at once: | 1 | Receiving room volume: | 300 m3 |
| Nominal free area of single ventilator: | 2500 mm2 | Source room volume: | 115 m3 |
| Product identification: | Simon Acoustic TTF Slimline - Open | | |

| Freq f Hz | Element normalised level difference Dn,e dB | |
|---|---|---|
| | 1/3 Oct | 1/1 Oct |
| 100 | 39.0 $ | 38.2 |
| 125 | 38.9 $ | |
| 160 | 37.0 % | |
| 200 | 36.1 % | 34.8 |
| 250 | 34.7 % | |
| 315 | 33.9 | |
| 400 | 34.1 | 35.2 |
| 500 | 35.1 | |
| 630 | 36.7 | |
| 800 | 33.4 | 31.2 |
| 1000 | 31.7 | |
| 1250 | 29.4 | |
| 1600 | 30.3 | 31.9 |
| 2000 | 33.7 | |
| 2500 | 32.5 | |
| 3150 | 33.5 | 34.5 |
| 4000 | 33.5 | |
| 5000 | 37.9 | |
| *6300+* | *39.6* | *39.9* |
| *8000+* | *39.4* | |
| *10000+* | *40.7* | |
| Average 100-3150 | 34.4 | |




Rating according to BS EN ISO 717-1:1997

Dn,e,w(C;Ctr)= 33 (-1;-1) dB

Notes :* designates measurement corrected for background

# designates limit of measurement due to background

% designates measurement corrected for flanking

$ designates limit of measurement due to flanking

+ designates frequency beyond standard

v1.2