Planning Statement

Subdivision of office premises and external alterations

41 Bedford Square with 11 Bedford Avenue,
London WC1B 3HX

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41 Bedford Square & 11 Bedford Avenue

Planning Statement

Contents

1. Introduction

These applications are for both planning permission and listed building consent in connection with the internal separation of the rear building (known as No.11 Bedford Avenue) to provide a separate B1 office unit; replacement of air conditioning units and the remodelling of a two storey linking bridge which joins the two buildings at the rear.

Internal alterations and other restoration works are also proposed at the site. These form the basis of a parallel Listed Building Consent application. These proposals are dealt with in detail in the Heritage Statement which should be read in conjunction with this Planning Statement. Other external works such as cleaning the facades of the buildings are discussed within the Heritage Statement.

2. The Property

No.41 Bedford Square is Grade I Listed in the Bloomsbury Conservation Area. The property forms part of the southern terrace of Bedford Square, built towards the end of the 18th Century and considered to be one of the best examples of Georgian town planning in London. No.41 is four storeys high plus basement, with a mansard roof forming the attic storey. The rear two storey plus basement is a red brick building built towards the end of the 19th Century. The application site also lies within an Archaeological Priority Area.

3. Policy and Legislation

Any assessment of the Listed Building and planning applications should be based on the national and local planning policies outlined below, as well as previous planning history for the property.

As the property is a Grade I Listed Building within the Bloomsbury Conservation Area, there is a statutory duty to pay special attention to the desirability of preserving the building or its setting and any historic fabric as well as preserving or enhancing the character or appearance of the conservation area, in accordance with Section 66 and 72 of the Listed Buildings and Conservation Areas Act (1990).

3.1 National Planning Policy Framework (NPPF) 2019

Chapter 6 'Building a strong, competitive economy' of the national framework sets out the aim to ensure that planning policies and decisions help to create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development.

Chapter 16 of this document 'Conserving and enhancing the historic environment' sets out guidance relating to the need to pay special attention to the historic environment, of relevance as the application site lies within a Conservation Area and is Grade 1 Listed. The NPPF notes that local authorities should take account of the desirability of sustaining and enhancing the significance of heritage assets; the positive contribution that conservation of heritage assets can make to sustainable communities; and the desirability of new development making a positive contribution to local character and distinctiveness.

When considering the impact of proposed development on the significance of a designated heritage asset, such as a Listed Building, the NPPF notes that great weight should be given to the asset's conservation; the more important the asset, the greater the weight should be given.

3.2 Planning and Compulsory Purchase Act 2004

Section 38.6 of the 2004 Act states that all planning applications must be determined in accordance with the development plan *unless material considerations indicate otherwise*. In this case, the statutory development plans consist of Camden's Local Plan 2017 and the London Plan 2016.

3.3 Camden Council Local Plan 2017

Policy E1 (Economic development) - *The Council will secure a successful and inclusive economy in Camden by creating the conditions for economic growth and harnessing the benefits for local residents and businesses.*

In order to secure a strong and successful economy, the Council will support businesses of all sizes, particularly start-ups, small and medium-sized enterprises.

Small businesses often seek premises that have flexible terms like shorter leases, layouts that can adapt as the business grows or changes and networking space to interact with other small business or to meet with clients. Therefore, as well as safeguarding existing employment sites, we will seek the provision of innovative new employment floorspace in developments that will provide a range of facilities including: flexible occupancy terms; flexible layouts; studios; workshops; and networking, socialising and meeting space that will meet the needs of a range of business types and sizes."

Policy D2 (Heritage) -*The Council will preserve and, where appropriate, enhance Camden's rich and diverse heritage assets and their settings, including conservation areas, listed buildings, archaeological remains, scheduled ancient monuments and historic parks and gardens and locally listed heritage assets.*

Listed Buildings - Listed buildings are designated heritage assets and this section should be read in conjunction with the section above headed 'designated heritage assets'. To preserve or enhance the borough's listed buildings, the Council will: i. resist the total or substantial demolition of a listed building; j. resist proposals for a change of use or alterations and extensions to a listed building where this would cause harm to the special architectural and historic interest of the building; and k. resist development that would cause harm to significance of a listed building through an effect on its setting.

Archaeology -*The Council will protect remains of archaeological importance by ensuring acceptable measures are taken proportionate to the significance of the heritage asset to preserve them and their setting, including physical preservation, where appropriate.*

Policy A1 (Managing the Impact of Development) - the Council will seek to protect the quality of life for occupiers and neighbours through the consideration of factors such as (e). visual privacy, outlook; (f.) sunlight, daylight and overshadowing.

Policy A4 (Noise and Vibration) – the Council will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity.

3.4 Mayor of London's London Plan 2016

Policy 2.10 Central Activities Zone – This combination of challenges and opportunities, and the scale and pace of change in inner London justifies a distinctive planning policy approach. Overall, the objective should be to encourage growth, but to manage it in ways that help improve quality of life and opportunities for both existing and new residents and maximise the opportunities for their involvement.

Policy 4.2 Offices – recognises the need to improve London's economic competitiveness.

Policy 7.6 Architecture Part B9(d) - development should not cause harm to the amenity of surrounding land and buildings particularly residential buildings in relation to privacy overshadowing and privacy;

Policy 7.8 Heritage Assets - development should be sympathetic to scale, form, materials and architectural detailing;

Policy 7.15 Reducing and Managing Noise - with mitigation where necessary.

4. Planning History

The planning history to the application site is a material consideration in the determination of the application and is set out below. The following relate to both 41 Bedford Square and 11 Bedford Avenue.

- 2016/2865/L - Internal renovation of office and amenity accommodation including minor alterations and general upgrade - approved 26.05.16

- 2007/2600/L & 2007/2595/P - Alterations to office building including internal partitions to third and lower ground floors, 4 condenser units with louvred acoustic screens, internal heating electrical and date services replacement, windows to rear mews building, acoustic screen and new glazed screen to courtyard approved 08.06.07

- HB647 - Refurbishment of main building and rebuilding of mews building at rear for office use – approved 22.06.73

- HB294 - Removal of partitions in basement, first and second floor, replacement of central rear basement windows, works to third floor, fire screening - approved 28.04.71

- HB208 - Alterations to 5 existing openings to sub divide buildings at 40 and 41 Bedford Square - approved 16.10.70

There is relevant planning history of properties at and in close proximity to the application site.

42 Bedford Square

The applications with the respective council planning reference numbers are as follows:

- 2014/4634/L - Listed Building Consent for works associated with conversion of building containing 6 self-contained dwellings to single family dwelling including erection of two storey infill extension at lower ground floor to existing link between primary and mews building (including 13 Bedford Avenue) - Granted 02.09.14

- 2015/3950/L - Listed Building Consent for installation of secondary glazing to all rear windows- Granted 20.10.17
- 2017/5023/L - Listed Building Consent for internal alterations at first floor - Granted 22.09.17
- 2017/4808/L - Listed Building Consent for works to lower ground floor - Granted 22.09.17.

43 Bedford Square

The applications with the respective council planning reference numbers are as follows:

- 2015/2782/P & 2015/3341/L Listed Building Consent and planning permission dated 05.08.15 for conversion of former school/existing office space into an all through school, including minor remodelling and full refurbishment of Grade I Listed Building, reopening up of historic windows and doors, additional openings within internal courtyard to attached mews and free standing glass canopy.

5. Commentary on Proposals

5.1 Replacement of Air Conditioning Units

The property has previous consents for air conditioning units and plant which demonstrates that such services can be provided without impacting on either neighbouring amenities or historic fabric. Bedford Square is not residential and is in a central London location with higher background noise levels as a result. The proposed replacement air conditioning units are sited sensitively within a bespoke plant room to the inner courtyard in the lower ground floor and also in the under-pavement vaults to the front basement lightwell. The noise control system is based on the selection of intrinsically quiet modern air conditioning units, distance from the plant to the receptors, and replacement plant room doors specifically designed to attenuate noise.

The air conditioning units are small in scale within the context of the application site. They are of a standard design, of a neutral colour specification and therefore considered to be neutral in terms of its impact on the setting of the Listed Building itself.

A full acoustic survey (see Appendix 1) has been carried out measuring noise levels from the nearest noise sensitive facades in line with BS 4142:2014. This accompanying acoustic report from Ion Acoustics demonstrates that there will be no noise nuisance to neighbours and is fully compliant with the WHO guidelines. The specification of the replacement air-condenser units is also included in the Appendix.

The air-conditioning units will not result in any loss of historic fabric and will preserve the character of the wider Conservation Area in general. The plant will be compliant with Policy A4 of the Local Plan and 7.15 of the London Plan as well policies which seek to protect historic fabric.

5.2 Separation of 11 Bedford Avenue for separate office premises.

National policy recognises the need to create a strong and competitive economy. The Council's local plan policies help to create the conditions in which businesses can invest, expand and adapt. Paragraph 5.6 of the Local Plan states that: *In order to secure a strong and successful economy, the Council will support businesses of all sizes, particularly start-ups, small and medium-sized enterprises.*

Paragraph 5.9 goes on to evidence that "*small businesses often seek premises that have flexible terms like shorter leases, layouts that can adapt as the business grows or changes and networking space to interact with other small business or to meet with clients. Therefore, as well as safeguarding existing employment sites, we will seek the provision of innovative new employment floorspace in developments that will provide a range of facilities including: flexible occupancy terms; flexible layouts; studios; workshops; and networking, socialising and meeting space that will meet the needs of a range of business types and sizes".*

The rear building known as 11 Bedford Avenue will stay in its permitted existing B1 use as will the main building. Facilities will be upgraded to allow for a more flexible way of working. The sub division allows for the creation of two separate planning units with reversible internal partitioning should the need to revert back to a connected property be required in the future. The physical works involved are contained within the Heritage Statement and which should be read in conjunction with this statement.

The properties already have separate entrances and benefit from different address points located on different streets. The separation into two office units, one large independent unit to the front building and a smaller more flexible unit to the rear, will support economic growth and productivity in the area and Camden in general, as it takes into account both local business needs and wider opportunities for development. This separation of Bedford Avenue as office space will provide much needed smaller and more flexible office accommodation to meet the requirements of Policy E1 of the Local Plan and the aims of the NPPF.

Currently the office uses operate as separate units both fronting different streets with individual front doors. The Council requires that development within conservation areas preserves the character of that area. Both Bedford Square and Bedford Avenue are centrally located and comprise mainly of commercial and non-residential uses. The NPPF itself recognises the positive contribution that heritage assets can make to sustainable communities including their economic vitality. These internal alterations leading to two separate office uses will have a neutral impact on the character of the wider Bloomsbury Conservation Area given the above; and so accord with Policy D2 of the Local plan and the aims of the NPPF.

5.3 Design of the Remodelled Link-building

Chapter 16 of the National Planning Policy Framework (NPPF) sets out guidance relating to conserving and enhancing the historic environment. It notes that local authorities should take account of the desirability of sustaining and enhancing the significance of heritage assets; the positive contribution that conservation of heritage assets can make to sustainable communities; and the desirability of new development making a positive contribution to local character and distinctiveness.

Paragraph 192 of the National Planning Policy Framework states that, 'In determining planning applications, local planning authorities should take account of the:

- desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;
- positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and
- desirability of new development making a positive contribution to local character and distinctiveness.

There is an existing link-block between the two buildings at basement and raised ground floor level. This existing link block is not an original historic feature. When viewed from the courtyard, the elevation appears incongruous by virtue of the modern glass sitting below the upper traditional style timber framed windows. It has poor quality detailing and there are also some areas of wet rot decay.

The proposed replacement is a parred down link building with an open side to create a covered but lighter weight terraced area. The proposed link is smaller in scale than the existing extension and will remain subservient to the main building. There will be no loss of historic fabric. The existing upper floor terrace will be re-paved in Yorkstone which will also be used into the link building to ensure a continuous and cohesive material palette. The setting and integrity of the Listed Building is not compromised and the character and appearance of the conservation area is enhanced. The proposal complies with Policy D2 of the Local Plan and aims of the NPPF.

This link building and upper floor terrace are existing features set at a low level between both existing B1 office uses. The remodelling of this area will not result in any intensification of use by members of staff. As there are no residential properties adjacent there would be no detriment to residential amenities through overlooking from the use of the terraced area. In more general terms of overlooking and loss of privacy there are no policies which seek to control distances to safeguard privacy between commercial uses. Whilst there is some opaque glazing proposed to the rear elevation of 11 Bedford Avenue this is to ensure privacy between users of its office premises and office users within 41 Bedford Square and its existing courtyard.

5.4 Other Works

The external and internal works proposed to both buildings including treatment of facades, are discussed in detail in the Heritage Statement which should be read in conjunction with this statement. It is worth noting that the planning history to both properties demonstrates that sensitive and appropriate alterations have been previously allowed.

5.5 Archaeology

The proposals do not involve any below ground works and therefore a Written Statement of investigation (desk top) is not considered necessary to determine the applications.

5.6 Access

The building is Grade 1 Listed and as such there will be no proposed alterations to the access arrangements at pavement level into the main building for 41 Bedford Square and 11 Bedford Avenue. There is an internal lift to all floor landings which will remain in Bedford Square, although this has only provided access to floor landings. The proposals remain neutral in terms of access and are therefore considered to comply with current legislation in terms of disabled access arrangements.

6. Documents for Planning and Listed Building Submissions

The applications are accompanied by the following supporting documents and information to make the applications valid:

- Plans and elevations (existing and proposed, external and internal), including site plan and sections and details for listed building works;
- Planning statement, including access information;
- Heritage statement;
- Community Infrastructure Levy form (payment not required as no internal floorspace being created).
- Environmental Noise Survey Report
- Technical Specifications for replacement air-condenser plant

7. Conclusion

The applications seek to install modern and quiet air conditioning units to the rear lower ground courtyard and front basement vault. It is also proposed to formally separate the two distinct properties to provide two B1 offices, and remodel the existing link building.

The proposals are sympathetic to the scale and form of this Listed Building and the wider Bloomsbury Conservation Area in which it lies, whilst still preserving the amenities of neighbours and protecting the historic significance of this building. And because 41 Bedford Square and 11 Bedford Avenue have existing separate addresses and separate street doors, the proposed internal separation have a neutral impact on the character of the conservation area while contributing to the economic aims of the local area. It is therefore considered as demonstrated above, that the proposals are in full accordance with both local and national policies. We therefore respectively request that the proposals are supported by the local planning authority.

Appendix A

Plant Noise Report & Specification for Air Condenser Plant

41 BEDFORD SQUARE

PLANT NOISE REPORT

Acoustics Report A1480 R01

17th July 2019

Report for:	Een En Veertig Limited 4th Floor, St Pauls Gate 22 – 24 New Street St Helier Jersey JE1 4TR
Report to:	Smok architects Unit 3, New North House Canonbury Yard 190a New North Road London N1 7BJ Attention: Laurence Holmes
Prepared by: Patryk Rowiński BSc (Hons) AMIOA Acoustic Consultant	Checked by: David O'Neill BEng CEng MSc MIOA Director
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1 Introduction

Ion Acoustics is appointed by Smok architects to advise on plant noise emissions relating to installation of three condenser units on the grounds of a property at 41 Bedford Square, London. The proposal is to install one unit each in the two vaults at the front of the property, and another unit in a plant room just off the courtyard.

Ion Acoustics carried out a background sound survey on site between 4th and 8th July 2019 to measure existing sound levels in the area. These have been used to derive the noise limits applicable to the proposed plant in line with Local Planning Authority requirements. This report sets out the noise limits and provides an assessment of the plant noise emissions for compliance with those limits.

2 Scheme Details

2.1 Site Location

The property is located on Bedford Square in Fitzrovia, London. The area is predominantly residential in nature, although there are also some offices in the area. The property faces onto the Bedford Square open space to the north and incorporates a mews house across a courtyard to the south. To the immediate east and west are neighbouring terraced properties which are in residential use.

Figure 1 indicates the site location (green highlight), the two measurement locations used for the survey (MU1 and MU2), proposed locations of the condensers, and the surrounding area.

Figure 1 – Site location (highlighted in green) and surrounding area (© Google Maps)

2.2 Proposed Scheme

The proposal is to install three condenser units – two at the front of the property in vaults under the pavement, and one in a plant room forming a part of the mews house at the rear of the property. They will be housed behind louvred doors, to which the neighbouring properties will have some line of sight. We are informed the plant will only operate during office opening days and hours, i.e. Monday to Friday, 09:00 to 17:00. The nearest sensitive receptor is approximately 4.5m away at the front of the property, and approximately 6m away at the rear.

The proposed outline layout is shown in Figure 2.

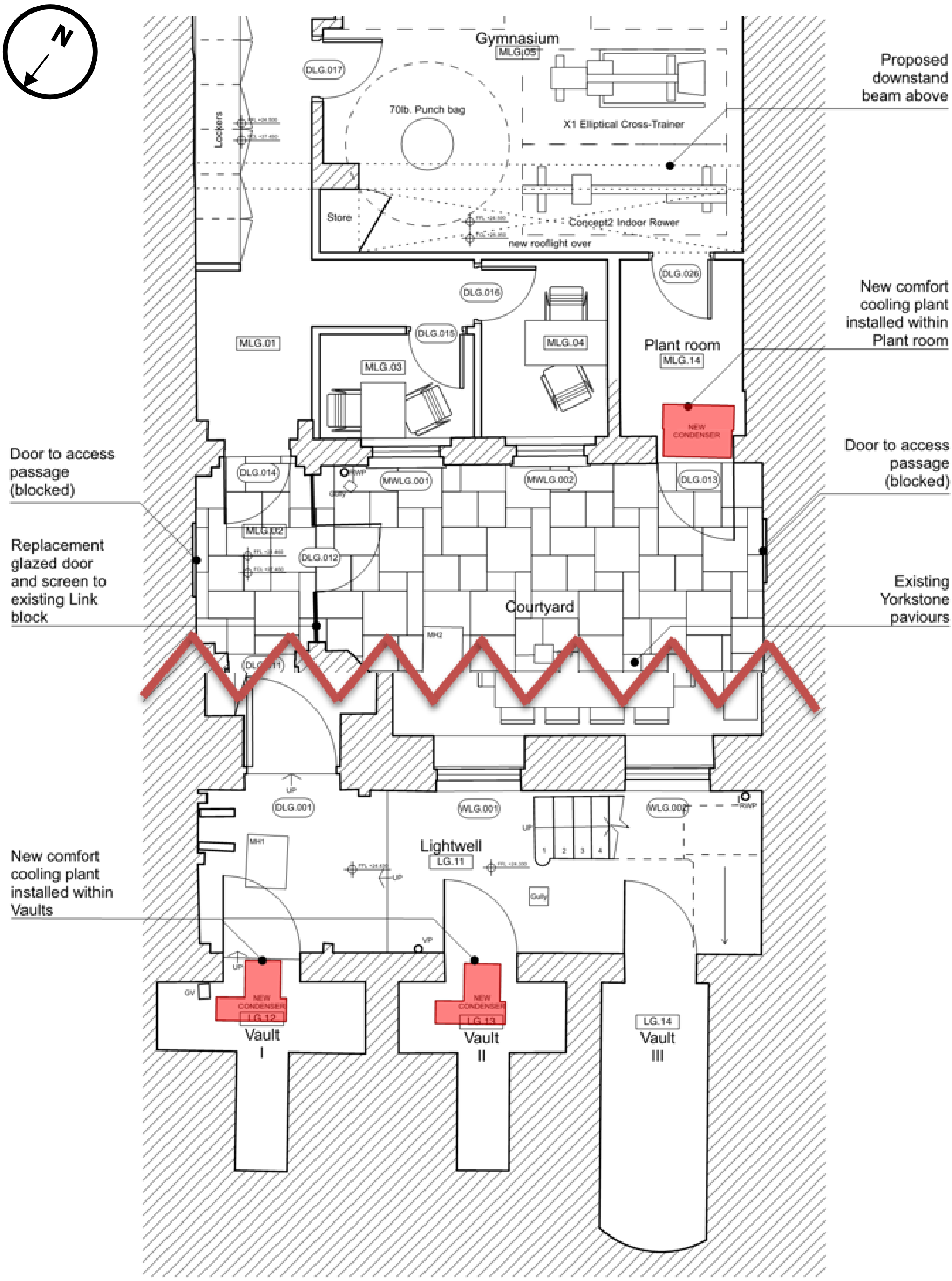


Figure 2 – Proposed Arrangement and Condenser Locations (shaded red)

3 Local Planning Authority Criteria

Camden Council provides guidance on assessing industrial and commercial noise sources (such as mechanical plant), and any planning conditions relating to noise imposed on this scheme would likely be based on this guidance. Specifically, Policy A4 Noise and Vibration of the Camden Local Plan states how noise and vibration generating development is managed. The criteria for deriving plant noise limits is found in Appendix 3, Table C of the same document, and is reproduced in Figure 3.

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dBL_{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dBL_{Amax}

Figure 3 – Camden Council DP 28 Table E indicating recommended noise limits for new external plant

The policy therefore requires external noise emission from new external plant to be controlled to a level of 10 dB(A) below the background sound level (L_{A90}, dB) during the daytime and night time periods. The daytime and night time periods are defined as 07:00 to 23:00 hours, and 23:00 hours to 07:00 hours respectively. The noise limits apply both in the garden and at 1m away from the façade, outside sensitive windows of sensitive receptors. A note is also provided regarding tonality etc.:

> *"10dB should be increased to 15dB if the noise contains audible tonal elements (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required"*

A further comment is provided with regards to certain types of mechanical plant:

> *"There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels*

(ordinarily determined by a BS: 4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted Leq,5mins noise levels in octave bands) 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area."

It is noted the document does not include a method for assessing external plant noise, but refers to BS4142: 'Methods for rating and assessing industrial and commercial sound'. The latest version of BS4142 was published in 2014, and includes guidance for assessing external plant noise, and in particular, for determining the background sound level at a measurement location. BS 4142:2014 is discussed in the next section.

4 Planning Policy and Other Guidance on Noise

4.1 BS 4142: 2014 – Assessment Principles

The standard method for assessing noise of an industrial nature affecting nearby housing is British Standard BS 4142 "Method for rating and assessing industrial and commercial sound". A BS 4142 assessment is made by determining the difference between the intrusive noise under consideration and the background sound level as represented by the L_{A90} parameter, determined in the absence of the intrusive noise. The L_{A90} parameter is defined as the level exceeded for 90% of the measurement time. Therefore, it represents the underlying noise in the absence of short-term events.

BS 4142: 2014 states: *'In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods'.*

The intrusive noise under consideration is assessed in terms of the ambient noise level, L_{Aeq}, but a character correction penalty can be applied where the noise exhibits certain characteristics such as distinguishable tones, impulsiveness or, if the noise is distinctively intermittent. The ambient noise level, L_{Aeq} is defined as the steady-state noise level with the same energy as the actual fluctuating sound over the same time period. It is effectively the average noise level during the period. The plant noise level (L_{Aeq}) with the character correction (if necessary) is known as rating level, L_{Ar}, and the difference between the background sound and the rating level is determined to make the BS 4142 assessment. The standard then states:

- *"Typically, the greater the difference, the greater the magnitude of the impact.*
- *A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5dB 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 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."*

The standard states that the objective of a noise survey *"is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods"*. A typical background sound level is usually derived by means of statistical analysis as opposed to, for example, a mean average or the lowest. This is typically achieved by creating a frequency distribution graph of the background sound levels measured, rounded to the nearest whole number. Normally the "typical" background sound level is the most frequently occurring, however sometimes it may be appropriate to choose a different one, if considered more representative.

The standard outlines a number of methods for defining appropriate 'character corrections' to determine the rating level to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency.

The standard also highlights the importance of considering the context in which a sound occurs. The standard indicates that factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the existing acoustic character of the area should be considered when assessing the noise impact.

5 Noise Survey

5.1 Procedure

A baseline sound survey was carried out from Thursday 4th to Monday 8th July 2019, to determine the local sound climate and hence derive the plant noise limit as well as to inspect the site. Two measurement positions were used – one at the front of the property, attached to the neighbouring property's hoarding (Figure 4) and one in the rear courtyard (Figure 5). The two sound level meters were set up to log various noise indices at 15-minute intervals. The noise survey was conducted in accordance with BS 4142:2014 and BS 7445-1: 2003. Both sound level meters were calibrated with a Brüel & Kjær Type 4231 calibrator. All equipment was within its respective calibration periods (one year for calibrator, two years for sound level meters), with equipment references and calibration certificates available on request. The two measurement locations are described below.

5.2 MU1 – Front

MU1 was at the front of the property, attached to the hoarding surrounding the neighbouring property, as shown in Figure 4. A Rion NL52 with a WS-15 windshield was used at this location. The microphone was located 1m from the building's façade, at a height of approximately 2.7m above local ground level. This was considered the most representative measurement location on site. Due to the microphone being at 1m away from a vertical reflecting surface the sound levels measured are considered façade levels. As the local authority noise limits are set out in terms of façade levels also, no corrections to free field will be applied. Calibration drift on collection was 0.1dB which is within acceptable tolerances.

The acoustic environment comprised mainly local activity noise and road traffic noise, with some contribution from building site activity.

Figure 4 – Measurement Location MU1

5.3 MU2 – Rear

Location MU2 was in the courtyard separating the main house and the mews house, with the location shown in Figure 5. A Larson Davis 820 sound level meter with a BAP21 windshield was used. The microphone was tripod mounted at a height of approximately 1.5m above local ground level. The microphone was located in a corner, close to two vertical reflecting surfaces. This normally results in the sound levels measured being some 3dB higher than standard façade levels due to reflections (ie 6dB greater than the free field level). Therefore, 3dB will be subtracted from the measured value to correct the sound levels to façade levels. Calibration drift on collection was 0.1dB which is within acceptable tolerances.

The acoustic environment was dominated by activity in the courtyard and in the neighbouring houses, with distant road traffic noise dictating background sound levels.

Figure 5 – Measurement Location MU2

5.4 Weather

As the survey was not attended, detailed weather notes are not available apart from the setup and collection periods, however the period was selected as it had a forecast of dry weather with low wind speeds and was considered suitable for such noise monitoring. On setup, the weather was warm and dry, with a temperature of 25°C, with no wind, and no cloud cover. On collection, the temperature was 22°C with 50% cloud cover, and again no wind. Overnight the forecast indicated low wind speeds and no rain. Historical data taken from a nearby weather station at an online weather service[1] showed low wind speeds and no rain for the survey duration.

[1] www.wunderground.com

6 Survey Results

Survey data, comprising daily noise level graphs and tabulated noise levels for both locations, are in Appendix A.

6.1 Survey Results - Front

The noise level graph for the overall survey period is shown in Figure 6. The noise levels measured over the survey period follow the typical day-night cycle fairly closely, with the exception of Saturday evening when noise levels rise for approximately an hour. The cause of this cannot be identified due to a lack of audio recordings, however in any case it is of little consequence to the assessment of the LA90 levels. It is noted that this sound level meter was set up effectively on a building site, however construction related noise does not appear to have affected the background noise recordings, as evidenced by a lack of significant drop off in the L_{A90} noise levels around 16:00 – 17:00 hours when work usually stops for the day.

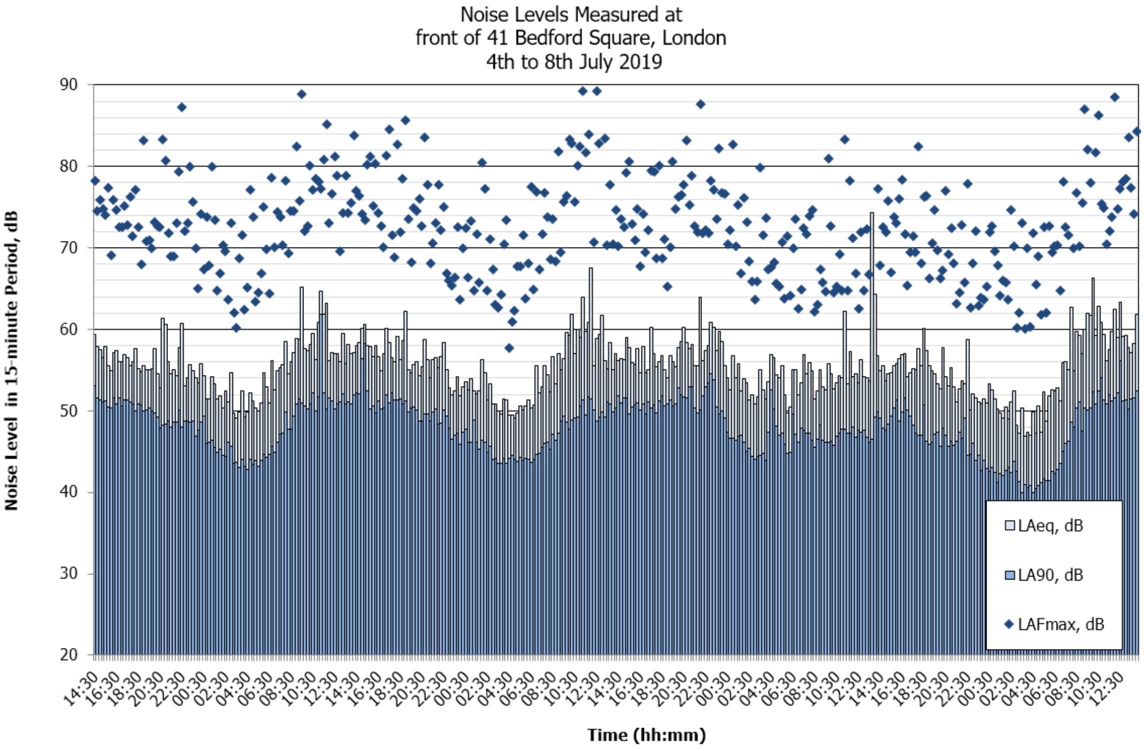


Figure 6 – Noise Level Data Measured at MU1

The typical noise levels measured are summarised in Table 1. The typical L_{A90} level is shown following the principles of BS 4142. The typical values in this case have been derived based on using the most frequently occurring value. These cover the period 07.00-19.00 hrs to allow for some potential overrun from the normal operating hours.

Table 1: Summarised Noise Survey Results - Front

Day period	Duration (hh:mm)	Day	Typical L_{Aeq} (dB)	Typical L_{A90} (dB)
Day (07:00 – 19:00)	16:00	Thursday	56.7	50
		Friday	58.2	51
		Monday	60.6	51
Typical defined as: L_{Aeq} – Logarithmic average L_{A90} – Most frequently occurring				

The noise levels presented in Table 1 indicate a stable environment over the survey period, with only up to 2dB deviation in terms of the L_{Aeq} and up to 4dB in terms of the L_{A90}. With regards to the L_{A90} Sunday night appears to be the outlier, with deviation of only 1dB between the other days, both for daytime and night time. As the plant will not operate on Sundays, this period is in any case excluded from the assessment – as well as the Saturday results. The night period is also not considered further as no plant operation is proposed at night.

6.2 Survey Results – Rear

The overall graph of noise levels measured during the survey is shown in Figure 7. Again, there is a clear day-night pattern evident in the noise levels measured. The location is shielded away from roads which results in noise levels lower than those measured at MU1. As the building is currently in use, activity noise would have affected the daytime L_{Aeq} noise levels somewhat, however the L_{A90} background noise levels are unlikely to have been significantly affected. As discussed in Section 5.3, 3dB has been subtracted from the measured values to correct the measured noise levels to façade levels.

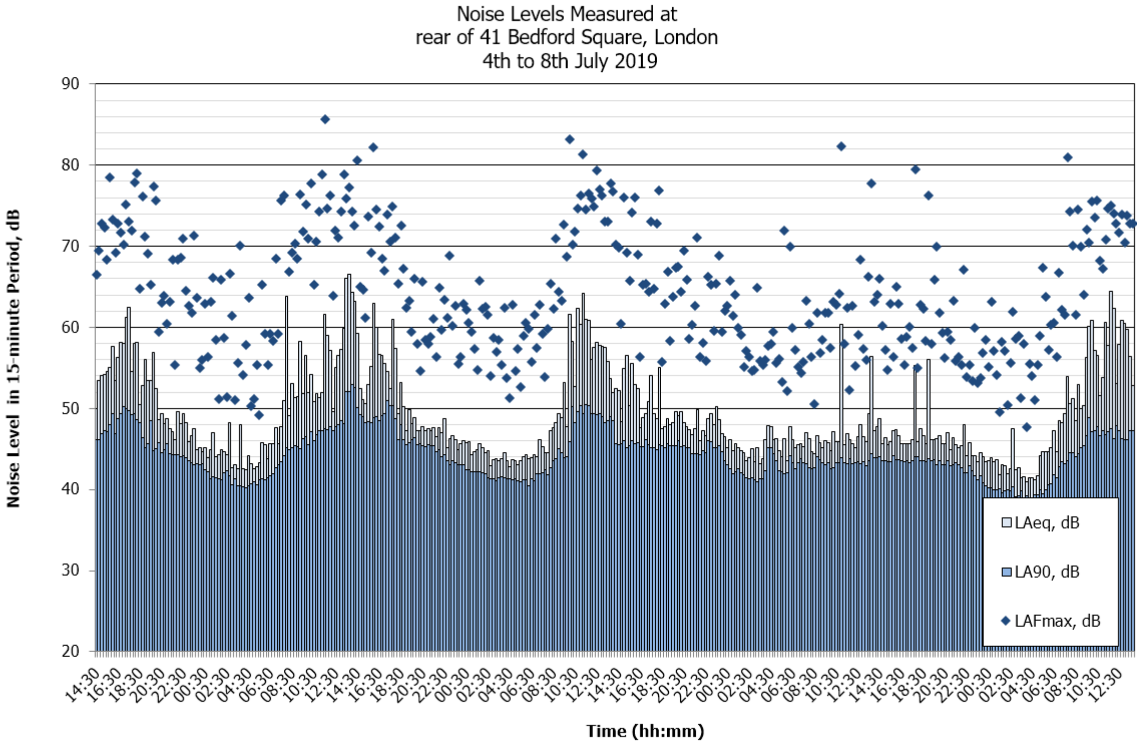


Figure 7 – Noise Level Data Measured at MU2

The typical noise levels measured are summarised in Table 1. The typical L_{A90} level is shown following the principles of BS 4142. The typical values in this case have been derived based on using the most frequently occurring value.

Table 2: Summarised Noise Survey Results – Rear

Day period	Duration (hh:mm)	Day	Typical L_{Aeq} (dB)	Typical L_{A90} (dB)
Day (07:00 – 19:00)	16:00	Thursday	55.2	47
		Friday	57.2	47
		Monday	57.6	46
Typical defined as: L_{Aeq} – Logarithmic average L_{A90} – Most frequently occurring				

The noise level reported in Table 2 indicate a fairly stable noise environment, again especially in the case of the L_{A90} background sound levels. The Saturday – Sunday daytime period is noticeably lower in terms of the L_{A90}, however as it falls during the weekend it will not be considered in any case.

6.3 Noise Limits

As the plant is only for office use, the background sound levels are taken for the period between 08:00 to 18:00 hours from the three weekday daytime period. This is to allow an hour before and after office opening times. These levels and the noise limits derived from them, are given in Table 3, with the frequency distribution graphs in Appendix B.

The requirement is for the noise from plant not to exceed a level 10dB below the background noise level at the nearest sensitive properties, unless there is a tonal element in which case the requirement is 15dB below the background noise level. An additional requirement of not exceeding NR35 applies if the location is in a "quiet background area".

Table 3: Noise Limit Derivation

Period	Location	Measured L_{A90} (dB)	Noise limit L_{Ar} (L_{A90} -10dB)	Noise limit if tonal L_{Ar} (L_{A90} -15dB)
08:00 – 18:00 hours	Front	51	41	36
	Rear	47	37	32

With the measured typical background levels at L_{A90} 51dB, we do not consider this a low background area, therefore the noise levels would not typically be assessed against the Noise Rating curve NR35.

7 Assessment

The scheme will use three Daikin RXYSQ8TY1 condensers – two at the front of the property and one at the rear. The source sound power level data, taken from the manufacturer's specification sheet, is given in Table 4. No 1/3 octave band data has been found for these units, but condenser units are not associated with tonality features. Therefore, the plant will be assessed against the -10dB noise limit.

Table 4: Plant Source Noise Level Data

Daikin RXYSQ8TY1 SWL (dB)							
63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	L_{WA}
*	82.0	72.0	71.0	67.0	64.0	58.0	73.3
*63Hz octave band value not provided in manufacturer's datasheet							

7.1 Front Condensers

The condensers are proposed to be installed at the front of the property in two existing vaults under the pavement. They will be housed behind louvred doors. The vault is a heavy masonry construction and the only significant noise emissions source is via the louvre are the front. To control noise emissions from the vaults, calculations indicated that an acoustic louvre is required, along with some absorptive lining to the vault to reduce source levels.

The sound reduction index requirements for the louvre are set out in Table 5. installed. This would typically only be achieved using a 270-300mm deep acoustic louvre (for example270mm louvre by EEC Ltd. is used in the calculations). The calculations are set out in full in Appendix C.

Table 5: Acoustic louvre sound reduction index requirements

Minimum R (dB) at Octave Centre Bands (Hz)						
	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz
	7	10	13	15	15	13

The noise levels incident upon the nearest receptor's façade were calculated by calculating the reverberant sound pressure level inside the vaults, followed by the sound transmission into the lightwell, followed by a distance correction to the nearest sensitive façade, approximately 4.5m away and assuming +6dB for reflective paths from the lightwell.

Calculations show that the source level in the vault also needs to be reduced and this is proposed to be achieved by providing a lining to each vault of 9m^2 of acoustic absorption. This needs to provide at least aw 0.4 at 125 Hz, so would typically be at least 50mm thick mineral fibre either fair faced or faced with a perforate metal sheet (min 25% perforation). The predicted noise levels at the receptor's façade of 41dB, compliant with the limit set out in Table 3. The full BS 4142:2014 assessment is shown in Table 6.

This is predicted based on the full operation of the condenser as set out in the manufacturer's data.

Table 6: BS4142:2014 Assessment for the Front Condensers

Results	Sound Level	Relevant Clause from BS4142	Commentary
Reverberant sound level of one condenser in one vault	$L_{Aeq,T}$ 65.8dB	7.1 7.3.6	Based on Daikin data
Typical background sound level	08:00 – 18:00: $L_{A90,12h}$ 51dB	8.1.3 8.2	Measured in absence of any plant
LPA Plant noise requirement relative to background	-10dB		See Section 3
Therefore noise limit	08:00 – 18:00: L_{Ar} 41dB		
Specific sound level calculated at nearest sensitive receptor	L_{Ar} 41dB	9.3	Sound transmission and point source distance correction
Acoustic feature correction	0dB	9.3	No acoustic features
Excess of rating level over background sound level	08:00 – 18:00: L_{Ar} -10dB	11	
Excess of rating level over LPA noise limits	08:00 – 18:00: L_{Ar} 0dB	11	
The rating level complies with the noise limit, therefore the specific sound source will have low impact.		11	
Uncertainty of the assessment	Not significant	10	No 63Hz octave band sound power level data is included in the manufacturer's specification, however noise in low frequency bands rarely has a significant impact on the overall rating level and condensers are generally dominant in frequencies above 63Hz. Background sound levels were measured over a number of days and were shown to be very stable and consistent over the survey period.

7.2 Rear Condensers

The rear condenser will be installed inside an existing plant room within the mews house at the rear of the property. Here we also recommend an acoustic louvre door to control the noise emissions, with the example product used in the calculations the same as above to meet the limits. The calculation method for determining the noise level incident upon the nearest sensitive façade is also the same as in Section 7.1, with the residential receptor façade approximately 6m away from the plant room door.

Calculations show that additional 7m^2 of Class A absorption will be required to control noise levels within the plant room, which results in a rating level of L_{Ar} 36dB at the nearest sensitive receptor.

This is compliant with the noise limit set out in Table 3. The BS 4142:2014 assessment is shown in Table 7.

Table 7: BS4142:2014 Assessment for the Rear Condenser

Results	Sound Level	Relevant Clause from BS4142	Commentary
Reverberant sound level of the condenser in plant room	$L_{Aeq,T}$ 67.0dB	7.1 7.3.6	Based on Daikin data
Typical background sound level	08:00 – 18:00: $L_{A90,12h}$ 47dB	8.1.3 8.2	Measured in absence of any plant
LPA Plant noise requirement relative to background	-10dB		See Section 3
Therefore noise limit	08:00 – 18:00: L_{Ar} 37dB		
Specific sound level calculated at nearest sensitive receptor	L_{Ar} 36dB	9.3	Sound transmission and point source distance correction
Acoustic feature correction	0dB	9.3	No acoustic features
Excess of rating level over background sound level	08:00 – 18:00: L_{Ar} -11dB	11	
Excess of rating level over LPA noise limits	08:00 – 18:00: L_{Ar} -1dB	11	
The rating level complies with the noise limit, therefore the specific sound source will have low impact.		11	
Uncertainty of the assessment	Not significant	10	No 63Hz octave band sound power level data is included in the manufacturer's specification, however noise in low frequency bands rarely has a significant impact on the overall rating level. Background sound levels were measured over a number of days and were shown to be very stable and consistent over the survey period.

7.3 Uncertainty

There is always an element of uncertainty in an acoustic assessment. This could relate to the baseline levels measured or the plant noise levels. In this case the baseline levels have been measured over a number of days, with the results indicating a stable and consistent acoustic environment at both locations. The plant noise data has been provided by Daikin, so are taken at face value; however, they are understood to represent full duty operation. This means that if the unit is operating on a lower demand, then levels would be lower. The sound power level in the 63Hz octave band is omitted in the supplier's data, however noise levels in this frequency band rarely have a significant effect on the overall A-weighted noise levels. Therefore, the uncertainties would not make a significant difference to the outcome of the assessment in practical terms.

8 Summary

A noise assessment has been carried out for a proposed plant installation at 41 Bedford Square, in Fitzrovia, London. A noise survey was conducted between the 4th and 8th July 2019 to establish the existing background sound levels and derive noise limits for the plant, in accordance with Local Planning Authority guidance and BS 4142:2014.

Calculations show that, with consideration given to sound attenuation measures, noise emissions from the plant can be controlled to meet the noise limits set out.

MU1 - Front

Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
04/07/2019 13:15	59.4	78.3	53.1	05/07/2019 01:15	52.5	69.6	44.4
04/07/2019 13:30	57.9	74.5	51.6	05/07/2019 01:30	51.1	63.7	46.1
04/07/2019 13:45	57.5	75.9	51.4	05/07/2019 01:45	54.7	73.0	45.6
04/07/2019 14:00	56.5	74.8	51.1	05/07/2019 02:00	49.7	62.0	43.6
04/07/2019 14:15	57.9	74.0	51.2	05/07/2019 02:15	49.1	60.2	43.7
04/07/2019 14:30	55.5	77.4	50.5	05/07/2019 02:30	49.8	68.7	43.0
04/07/2019 14:45	54.9	69.1	50.4	05/07/2019 02:45	52.5	71.5	44.1
04/07/2019 15:00	57.2	75.9	51.6	05/07/2019 03:00	49.2	62.4	43.2
04/07/2019 15:15	57.4	74.6	50.9	05/07/2019 03:15	49.9	65.1	42.8
04/07/2019 15:30	56.0	72.6	51.6	05/07/2019 03:30	52.2	77.1	44.0
04/07/2019 15:45	56.0	72.5	50.6	05/07/2019 03:45	51.2	73.8	43.4
04/07/2019 16:00	56.9	75.2	51.3	05/07/2019 04:00	50.4	63.4	43.9
04/07/2019 16:15	56.5	72.8	51.3	05/07/2019 04:15	50.0	64.5	43.2
04/07/2019 16:30	55.6	76.3	51.1	05/07/2019 04:30	51.0	66.9	43.9
04/07/2019 16:45	56.1	71.4	50.8	05/07/2019 04:45	54.7	75.0	44.7
04/07/2019 17:00	57.6	77.1	50.0	05/07/2019 05:00	52.9	69.8	44.3
04/07/2019 17:15	55.2	72.5	50.8	05/07/2019 05:15	51.0	64.4	44.6
04/07/2019 17:30	54.8	68.0	50.7	05/07/2019 05:30	56.2	78.6	45.7
04/07/2019 17:45	55.5	83.2	50.0	05/07/2019 05:45	52.6	70.1	44.9
04/07/2019 18:00	55.0	70.8	50.1	05/07/2019 06:00	54.9	74.4	46.1
04/07/2019 18:15	55.1	71.0	50.3	05/07/2019 06:15	55.3	73.8	47.1
04/07/2019 18:30	55.2	69.9	50.0	05/07/2019 06:30	55.7	70.3	47.3
04/07/2019 18:45	57.7	73.2	49.7	05/07/2019 06:45	58.5	78.2	49.9
04/07/2019 19:00	54.6	72.7	49.2	05/07/2019 07:00	54.6	69.3	47.8
04/07/2019 19:15	52.8	72.6	47.9	05/07/2019 07:15	56.1	74.5	47.7
04/07/2019 19:30	61.3	83.3	48.3	05/07/2019 07:30	57.1	74.5	49.4
04/07/2019 19:45	60.6	80.7	48.4	05/07/2019 07:45	58.9	82.5	50.8
04/07/2019 20:00	56.0	71.8	48.8	05/07/2019 08:00	58.7	75.8	51.5
04/07/2019 20:15	54.5	69.0	48.0	05/07/2019 08:15	65.2	88.9	51.0
04/07/2019 20:30	55.0	69.0	48.6	05/07/2019 08:30	57.7	72.0	50.6
04/07/2019 20:45	54.3	73.0	48.6	05/07/2019 08:45	57.4	72.7	50.2
04/07/2019 21:00	57.8	79.3	50.1	05/07/2019 09:00	58.2	80.1	50.8
04/07/2019 21:15	60.7	87.3	48.0	05/07/2019 09:15	59.5	77.1	52.2
04/07/2019 21:30	53.1	72.0	48.8	05/07/2019 09:30	56.3	78.5	50.0
04/07/2019 21:45	54.1	73.0	48.7	05/07/2019 09:45	60.9	78.1	51.7
04/07/2019 22:00	55.7	80.0	48.6	05/07/2019 10:00	64.7	77.2	61.8
04/07/2019 22:15	54.9	75.6	48.8	05/07/2019 10:15	61.9	80.8	52.2
04/07/2019 22:30	54.1	69.9	46.9	05/07/2019 10:30	63.2	85.2	50.2
04/07/2019 22:45	53.4	65.0	47.6	05/07/2019 10:45	56.2	73.1	51.6
04/07/2019 23:00	55.8	74.2	48.6	05/07/2019 11:00	57.2	76.6	51.2
04/07/2019 23:15	54.3	67.3	49.3	05/07/2019 11:15	57.0	81.2	50.2
04/07/2019 23:30	51.5	73.8	46.0	05/07/2019 11:30	57.0	78.8	50.8
04/07/2019 23:45	51.5	67.8	46.1	05/07/2019 11:45	56.0	69.6	51.1
05/07/2019 00:00	54.2	80.0	46.4	05/07/2019 12:00	59.5	74.3	52.1
05/07/2019 00:15	53.3	73.4	45.5	05/07/2019 12:15	55.8	78.8	50.8
05/07/2019 00:30	51.5	64.7	44.9	05/07/2019 12:30	58.1	74.3	51.1
05/07/2019 00:45	51.8	66.9	45.3	05/07/2019 12:45	57.0	75.5	50.9
05/07/2019 01:00	50.4	70.3	44.5	05/07/2019 13:00	57.1	83.8	51.9

Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
05/07/2019 13:15	58.0	77.0	52.2	06/07/2019 01:45	50.9	67.4	44.1
05/07/2019 13:30	58.4	76.4	52.1	06/07/2019 02:00	50.9	63.0	44.2
05/07/2019 13:45	60.1	74.1	56.4	06/07/2019 02:15	50.0	62.7	43.6
05/07/2019 14:00	60.6	73.4	58.3	06/07/2019 02:30	49.6	64.3	43.6
05/07/2019 14:15	58.0	80.2	52.4	06/07/2019 02:45	51.5	70.4	44.2
05/07/2019 14:30	57.9	81.2	50.2	06/07/2019 03:00	51.4	73.4	43.5
05/07/2019 14:45	56.6	75.2	50.6	06/07/2019 03:15	49.5	57.7	44.2
05/07/2019 15:00	58.0	80.4	49.7	06/07/2019 03:30	49.5	60.9	44.5
05/07/2019 15:15	56.7	74.3	51.2	06/07/2019 03:45	49.1	62.3	44.0
05/07/2019 15:30	54.9	72.7	50.2	06/07/2019 04:00	49.7	67.7	43.8
05/07/2019 15:45	57.0	70.1	50.3	06/07/2019 04:15	50.6	67.7	44.3
05/07/2019 16:00	60.1	81.3	52.0	06/07/2019 04:30	50.1	71.5	43.9
05/07/2019 16:15	58.4	84.5	51.0	06/07/2019 04:45	50.6	63.8	44.2
05/07/2019 16:30	56.5	71.5	52.2	06/07/2019 05:00	51.4	68.1	44.0
05/07/2019 16:45	56.1	68.8	51.3	06/07/2019 05:15	50.3	77.5	43.7
05/07/2019 17:00	59.1	82.7	51.3	06/07/2019 05:30	50.7	64.9	44.1
05/07/2019 17:15	56.3	71.9	51.5	06/07/2019 05:45	55.5	76.9	44.6
05/07/2019 17:30	58.6	78.5	50.8	06/07/2019 06:00	52.2	67.4	44.8
05/07/2019 17:45	62.2	85.6	51.2	06/07/2019 06:15	52.9	71.7	45.5
05/07/2019 18:00	55.0	73.5	49.9	06/07/2019 06:30	55.5	76.8	46.0
05/07/2019 18:15	54.7	68.2	50.3	06/07/2019 06:45	54.4	73.8	46.1
05/07/2019 18:30	55.7	74.9	50.5	06/07/2019 07:00	52.3	68.6	45.3
05/07/2019 18:45	56.0	74.5	50.1	06/07/2019 07:15	56.6	73.5	47.1
05/07/2019 19:00	54.3	76.0	48.7	06/07/2019 07:30	53.3	68.3	46.4
05/07/2019 19:15	55.4	72.7	48.8	06/07/2019 07:45	57.0	81.8	47.3
05/07/2019 19:30	58.8	83.5	49.6	06/07/2019 08:00	55.1	69.4	48.7
05/07/2019 19:45	56.3	77.7	49.6	06/07/2019 08:15	56.4	75.7	49.4
05/07/2019 20:00	54.1	68.1	48.7	06/07/2019 08:30	59.6	76.4	48.6
05/07/2019 20:15	56.3	70.6	49.9	06/07/2019 08:45	59.2	83.3	47.7
05/07/2019 20:30	56.5	73.0	50.2	06/07/2019 09:00	61.9	82.8	48.9
05/07/2019 20:45	55.3	77.7	48.4	06/07/2019 09:15	57.0	75.7	49.1
05/07/2019 21:00	56.7	72.2	48.5	06/07/2019 09:30	60.0	80.1	49.2
05/07/2019 21:15	58.4	75.0	50.1	06/07/2019 09:45	59.0	82.5	50.6
05/07/2019 21:30	55.0	66.9	49.3	06/07/2019 10:00	64.0	89.2	51.4
05/07/2019 21:45	52.8	66.0	47.9	06/07/2019 10:15	59.7	81.7	49.5
05/07/2019 22:00	51.9	65.4	46.5	06/07/2019 10:30	60.9	83.9	51.7
05/07/2019 22:15	52.4	66.4	47.0	06/07/2019 10:45	67.5	91.5	51.5
05/07/2019 22:30	54.2	72.5	47.2	06/07/2019 11:00	55.6	70.7	50.1
05/07/2019 22:45	51.8	63.7	45.9	06/07/2019 11:15	58.9	89.2	48.8
05/07/2019 23:00	53.0	69.9	47.4	06/07/2019 11:30	59.4	82.8	49.2
05/07/2019 23:15	53.6	72.4	47.8	06/07/2019 11:45	61.7	91.3	49.9
05/07/2019 23:30	52.6	66.4	46.1	06/07/2019 12:00	56.2	83.4	49.2
05/07/2019 23:45	53.9	73.3	46.2	06/07/2019 12:15	55.2	70.3	51.1
06/07/2019 00:00	52.5	64.8	48.9	06/07/2019 12:30	58.4	77.8	50.9
06/07/2019 00:15	52.1	71.7	46.2	06/07/2019 12:45	55.1	70.5	49.9
06/07/2019 00:30	52.4	65.7	45.3	06/07/2019 13:00	57.0	74.7	50.4
06/07/2019 00:45	56.3	80.5	46.4	06/07/2019 13:15	56.2	70.2	51.8
06/07/2019 01:00	54.7	77.2	46.2	06/07/2019 13:30	56.4	73.5	51.0
06/07/2019 01:15	51.3	64.7	44.9	06/07/2019 13:45	56.3	72.6	51.6
06/07/2019 01:30	53.3	71.1	45.6	06/07/2019 14:00	59.0	79.2	51.6

Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
06/07/2019 14:15	57.8	80.6	49.6	07/07/2019 02:15	55.1	79.9	44.5
06/07/2019 14:30	55.9	72.9	50.5	07/07/2019 02:30	52.6	71.6	44.8
06/07/2019 14:45	55.7	70.9	50.7	07/07/2019 02:45	51.5	73.7	43.9
06/07/2019 15:00	57.6	74.8	51.0	07/07/2019 03:00	53.6	67.4	47.4
06/07/2019 15:15	54.7	67.7	50.1	07/07/2019 03:15	56.9	67.6	52.6
06/07/2019 15:30	57.9	74.1	50.8	07/07/2019 03:30	56.5	68.2	50.2
06/07/2019 15:45	54.7	69.4	49.6	07/07/2019 03:45	54.4	65.6	48.1
06/07/2019 16:00	55.1	72.2	51.1	07/07/2019 04:00	54.0	65.2	47.0
06/07/2019 16:15	60.3	79.5	50.4	07/07/2019 04:15	55.5	70.7	47.2
06/07/2019 16:30	57.0	79.3	50.7	07/07/2019 04:30	51.9	63.8	45.9
06/07/2019 16:45	55.4	68.7	49.7	07/07/2019 04:45	49.7	71.4	44.8
06/07/2019 17:00	56.1	80.1	51.2	07/07/2019 05:00	50.5	64.2	44.9
06/07/2019 17:15	56.8	68.7	51.8	07/07/2019 05:15	55.1	70.0	49.6
06/07/2019 17:30	55.0	71.1	50.6	07/07/2019 05:30	55.0	73.6	47.1
06/07/2019 17:45	54.1	65.2	50.8	07/07/2019 05:45	51.9	62.5	46.2
06/07/2019 18:00	56.8	70.1	51.4	07/07/2019 06:00	53.5	64.9	47.9
06/07/2019 18:15	56.1	80.6	50.6	07/07/2019 06:15	56.9	72.4	47.6
06/07/2019 18:30	55.4	74.8	50.8	07/07/2019 06:30	54.6	71.7	47.3
06/07/2019 18:45	57.8	76.2	52.8	07/07/2019 06:45	55.9	73.9	47.2
06/07/2019 19:00	58.5	76.5	51.9	07/07/2019 07:00	54.9	74.7	46.4
06/07/2019 19:15	60.2	77.8	51.7	07/07/2019 07:15	51.5	62.2	45.5
06/07/2019 19:30	58.4	83.2	51.6	07/07/2019 07:30	52.4	63.0	46.5
06/07/2019 19:45	57.6	75.3	52.9	07/07/2019 07:45	55.0	67.3	48.3
06/07/2019 20:00	58.1	78.8	52.9	07/07/2019 08:00	53.0	65.7	46.4
06/07/2019 20:15	55.6	72.7	50.4	07/07/2019 08:15	52.6	64.6	46.2
06/07/2019 20:30	55.5	71.9	49.7	07/07/2019 08:30	55.8	80.9	46.1
06/07/2019 20:45	63.9	87.7	50.1	07/07/2019 08:45	54.6	72.7	46.3
06/07/2019 21:00	56.2	71.8	51.8	07/07/2019 09:00	52.7	64.5	45.8
06/07/2019 21:15	57.4	72.2	53.0	07/07/2019 09:15	53.5	65.3	46.9
06/07/2019 21:30	58.0	71.8	53.5	07/07/2019 09:30	54.3	69.2	47.2
06/07/2019 21:45	60.8	78.3	54.6	07/07/2019 09:45	54.0	64.8	47.7
06/07/2019 22:00	60.2	77.1	53.8	07/07/2019 10:00	62.2	83.3	47.8
06/07/2019 22:15	57.4	73.6	50.5	07/07/2019 10:15	53.3	64.7	47.2
06/07/2019 22:30	59.7	82.2	49.6	07/07/2019 10:30	57.3	78.3	47.3
06/07/2019 22:45	58.5	76.7	50.0	07/07/2019 10:45	54.2	71.2	48.0
06/07/2019 23:00	55.6	76.6	49.1	07/07/2019 11:00	54.5	66.9	46.8
06/07/2019 23:15	54.1	70.5	47.4	07/07/2019 11:15	53.4	62.5	47.6
06/07/2019 23:30	52.6	72.2	46.7	07/07/2019 11:30	56.3	71.9	47.4
06/07/2019 23:45	56.8	82.7	46.7	07/07/2019 11:45	54.2	64.8	47.6
07/07/2019 00:00	54.0	70.2	46.4	07/07/2019 12:00	54.0	72.3	46.8
07/07/2019 00:15	55.8	75.3	46.9	07/07/2019 12:15	53.7	66.7	46.2
07/07/2019 00:30	52.4	66.8	47.0	07/07/2019 12:30	74.3	96.5	46.5
07/07/2019 00:45	53.9	76.1	46.2	07/07/2019 12:45	64.3	90.6	49.2
07/07/2019 01:00	53.4	73.2	45.0	07/07/2019 13:00	56.8	77.2	49.9
07/07/2019 01:15	51.3	68.3	45.4	07/07/2019 13:15	54.9	67.9	49.1
07/07/2019 01:30	51.9	65.9	44.4	07/07/2019 13:30	55.5	72.6	47.9
07/07/2019 01:45	50.9	63.7	44.1	07/07/2019 13:45	53.7	71.9	47.6
07/07/2019 02:00	51.7	65.9	44.4	07/07/2019 14:00	54.5	75.8	48.4

Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
07/07/2019 14:15	54.7	67.0	49.4	08/07/2019 02:15	50.4	73.0	39.9
07/07/2019 14:30	55.5	73.8	50.4	08/07/2019 02:30	46.9	60.1	40.9
07/07/2019 14:45	55.8	73.1	51.3	08/07/2019 02:45	47.4	69.9	40.6
07/07/2019 15:00	56.4	76.0	48.8	08/07/2019 03:00	47.0	60.3	40.8
07/07/2019 15:15	56.9	78.4	49.8	08/07/2019 03:15	49.9	71.8	40.0
07/07/2019 15:30	57.0	71.7	51.6	08/07/2019 03:30	47.2	65.5	40.5
07/07/2019 15:45	54.2	65.4	50.1	08/07/2019 03:45	50.6	69.0	40.8
07/07/2019 16:00	54.7	69.4	49.3	08/07/2019 04:00	47.4	61.8	41.2
07/07/2019 16:15	55.2	71.4	48.2	08/07/2019 04:15	52.3	72.6	41.7
07/07/2019 16:30	55.1	69.4	47.2	08/07/2019 04:30	48.7	62.0	41.5
07/07/2019 16:45	57.6	82.4	47.0	08/07/2019 04:45	51.8	72.7	41.4
07/07/2019 17:00	55.5	68.1	47.0	08/07/2019 05:00	52.6	69.5	42.6
07/07/2019 17:15	60.1	76.3	50.7	08/07/2019 05:15	52.5	70.2	42.3
07/07/2019 17:30	57.4	76.4	46.3	08/07/2019 05:30	52.8	70.3	42.8
07/07/2019 17:45	55.6	66.3	45.9	08/07/2019 05:45	51.2	64.8	43.6
07/07/2019 18:00	54.9	70.6	46.2	08/07/2019 06:00	55.9	78.1	45.0
07/07/2019 18:15	54.5	74.7	47.1	08/07/2019 06:15	56.0	72.5	46.0
07/07/2019 18:30	53.3	69.7	47.4	08/07/2019 06:30	55.1	71.6	46.3
07/07/2019 18:45	52.7	66.2	45.7	08/07/2019 06:45	62.7	95.6	48.6
07/07/2019 19:00	57.8	67.2	47.9	08/07/2019 07:00	54.9	69.9	48.0
07/07/2019 19:15	54.2	77.0	47.0	08/07/2019 07:15	59.7	76.7	50.4
07/07/2019 19:30	53.1	69.2	45.6	08/07/2019 07:30	59.2	70.2	51.1
07/07/2019 19:45	55.3	72.4	46.3	08/07/2019 07:45	57.0	75.5	47.5
07/07/2019 20:00	52.9	68.1	45.8	08/07/2019 08:00	60.0	87.0	50.4
07/07/2019 20:15	51.1	63.2	46.3	08/07/2019 08:15	62.0	82.1	50.1
07/07/2019 20:30	52.7	64.5	47.4	08/07/2019 08:30	61.7	78.0	50.4
07/07/2019 20:45	53.7	72.8	46.7	08/07/2019 08:45	66.3	94.2	52.3
07/07/2019 21:00	53.3	65.8	49.1	08/07/2019 09:00	59.3	81.7	50.8
07/07/2019 21:15	58.7	77.9	44.5	08/07/2019 09:15	62.9	86.3	52.5
07/07/2019 21:30	50.1	62.7	44.6	08/07/2019 09:30	60.8	75.4	54.1
07/07/2019 21:45	52.1	68.1	46.0	08/07/2019 09:45	59.4	74.9	51.3
07/07/2019 22:00	51.6	72.1	43.9	08/07/2019 10:00	56.2	70.5	50.9
07/07/2019 22:15	51.1	62.9	44.5	08/07/2019 10:15	57.5	72.1	51.9
07/07/2019 22:30	50.9	63.9	42.7	08/07/2019 10:30	59.7	73.8	51.2
07/07/2019 22:45	51.5	63.7	43.9	08/07/2019 10:45	62.5	88.5	51.6
07/07/2019 23:00	51.0	65.2	42.9	08/07/2019 11:00	59.0	74.8	52.2
07/07/2019 23:15	53.3	71.9	42.5	08/07/2019 11:15	63.3	77.3	56.2
07/07/2019 23:30	52.6	72.7	43.0	08/07/2019 11:30	59.1	78.1	51.2
07/07/2019 23:45	51.5	69.6	42.4	08/07/2019 11:45	59.3	78.5	51.3
08/07/2019 00:00	50.2	67.8	41.2	08/07/2019 12:00	57.8	83.6	50.2
08/07/2019 00:15	49.7	64.2	42.3	08/07/2019 12:15	57.2	77.4	51.5
08/07/2019 00:30	49.1	66.0	42.1	08/07/2019 12:30	58.3	74.2	51.6
08/07/2019 00:45	50.5	65.7	42.7	08/07/2019 12:45	61.8	84.3	52.4
08/07/2019 01:00	49.0	63.6	43.0	08/07/2019 13:00	0.0	0.0	0.0
08/07/2019 01:15	51.1	74.6	42.4				
08/07/2019 01:30	52.5	70.2	43.8				
08/07/2019 01:45	48.2	60.2	42.5				
08/07/2019 02:00	47.2	62.0	41.3				

MU2 - Rear

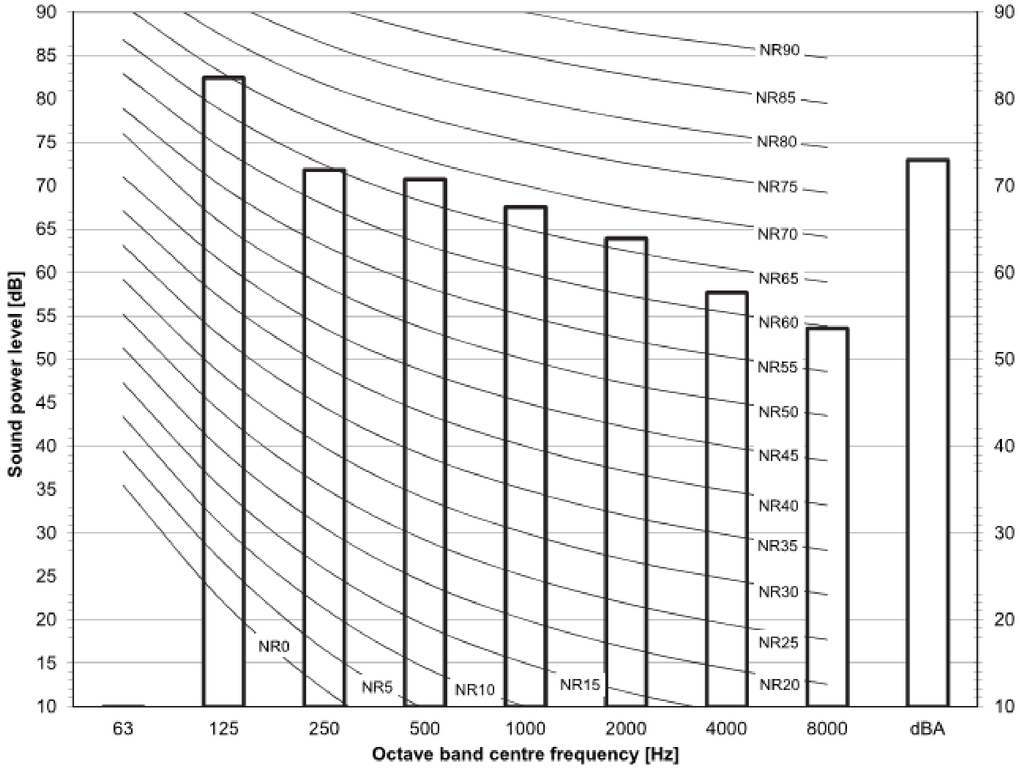
Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
04/07/2019 14:30	50.0	66.5	46.1	05/07/2019 02:30	44.3	51.4	42.3
04/07/2019 14:45	53.5	69.4	46.2	05/07/2019 02:45	48.2	66.6	41.7
04/07/2019 15:00	54.1	72.8	46.9	05/07/2019 03:00	42.7	61.4	40.6
04/07/2019 15:15	54.2	72.3	47.2	05/07/2019 03:15	43.0	51.0	41.3
04/07/2019 15:30	54.6	68.3	47.1	05/07/2019 03:30	42.5	55.6	40.4
04/07/2019 15:45	55.0	78.5	48.0	05/07/2019 03:45	48.0	70.1	40.5
04/07/2019 16:00	57.7	73.3	49.3	05/07/2019 04:00	42.5	54.1	40.3
04/07/2019 16:15	53.5	69.2	46.9	05/07/2019 04:15	42.4	57.8	40.2
04/07/2019 16:30	56.3	72.8	48.8	05/07/2019 04:30	44.2	63.6	40.5
04/07/2019 16:45	58.1	71.7	49.4	05/07/2019 04:45	43.2	50.3	40.7
04/07/2019 17:00	58.0	70.2	50.2	05/07/2019 05:00	42.5	51.1	41.0
04/07/2019 17:15	61.2	75.2	50.0	05/07/2019 05:15	42.8	55.4	40.6
04/07/2019 17:30	62.5	73.0	49.7	05/07/2019 05:30	43.3	49.2	41.2
04/07/2019 17:45	54.6	71.9	49.2	05/07/2019 05:45	45.8	65.3	41.3
04/07/2019 18:00	58.0	77.9	49.3	05/07/2019 06:00	45.5	59.2	41.2
04/07/2019 18:15	58.2	79.0	48.6	05/07/2019 06:15	43.8	55.3	41.5
04/07/2019 18:30	50.5	64.7	48.3	05/07/2019 06:30	45.6	59.2	41.7
04/07/2019 18:45	52.8	76.1	46.4	05/07/2019 06:45	45.7	58.3	42.0
04/07/2019 19:00	56.0	71.2	45.1	05/07/2019 07:00	47.6	68.5	42.7
04/07/2019 19:15	53.4	69.1	45.6	05/07/2019 07:15	45.7	59.2	43.1
04/07/2019 19:30	53.5	65.3	48.5	05/07/2019 07:30	47.8	75.7	43.4
04/07/2019 19:45	56.9	77.4	44.8	05/07/2019 07:45	51.0	76.3	44.2
04/07/2019 20:00	52.5	75.7	45.0	05/07/2019 08:00	63.8	94.9	45.2
04/07/2019 20:15	48.6	59.5	45.8	05/07/2019 08:15	49.1	66.8	44.9
04/07/2019 20:30	49.4	63.0	44.5	05/07/2019 08:30	53.1	69.2	45.2
04/07/2019 20:45	48.1	63.9	44.9	05/07/2019 08:45	51.4	70.3	45.4
04/07/2019 21:00	48.8	60.4	45.6	05/07/2019 09:00	51.5	68.5	45.3
04/07/2019 21:15	47.5	63.2	44.4	05/07/2019 09:15	58.3	76.4	45.0
04/07/2019 21:30	47.1	68.4	44.3	05/07/2019 09:30	51.8	71.8	46.3
04/07/2019 21:45	46.1	55.3	44.3	05/07/2019 09:45	56.5	75.2	46.5
04/07/2019 22:00	49.6	68.3	44.3	05/07/2019 10:00	52.0	70.9	45.5
04/07/2019 22:15	48.1	68.6	44.1	05/07/2019 10:15	54.2	77.7	47.1
04/07/2019 22:30	49.4	71.0	44.2	05/07/2019 10:30	50.8	65.3	46.0
04/07/2019 22:45	48.3	64.5	43.9	05/07/2019 10:45	51.8	70.6	46.8
04/07/2019 23:00	45.9	62.6	43.5	05/07/2019 11:00	51.3	74.3	47.3
04/07/2019 23:15	46.6	61.8	43.3	05/07/2019 11:15	51.9	78.8	47.2
04/07/2019 23:30	47.5	71.3	43.0	05/07/2019 11:30	61.6	85.7	47.5
04/07/2019 23:45	44.9	63.6	43.2	05/07/2019 11:45	59.0	74.6	47.4
05/07/2019 00:00	45.1	55.0	43.1	05/07/2019 12:00	57.2	76.2	47.7
05/07/2019 00:15	44.7	56.0	43.2	05/07/2019 12:15	49.6	63.9	47.3
05/07/2019 00:30	45.2	62.9	42.4	05/07/2019 12:30	55.1	71.9	47.8
05/07/2019 00:45	43.9	56.4	42.2	05/07/2019 12:45	56.5	71.1	48.0
05/07/2019 01:00	44.9	63.1	41.3	05/07/2019 13:00	57.3	74.3	48.5
05/07/2019 01:15	47.0	66.1	41.6	05/07/2019 13:15	59.9	78.8	48.1
05/07/2019 01:30	44.0	58.5	41.4	05/07/2019 13:30	66.0	75.9	52.1
05/07/2019 01:45	44.3	51.1	41.3	05/07/2019 13:45	66.5	77.3	52.1
05/07/2019 02:00	44.9	65.9	41.2	05/07/2019 14:00	64.3	74.3	52.9
05/07/2019 02:15	44.7	58.7	42.1	05/07/2019 14:15	63.2	72.6	52.6

Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
05/07/2019 14:30	59.3	80.6	50.1	06/07/2019 03:00	43.7	58.7	41.3
05/07/2019 14:45	52.5	65.0	49.2	06/07/2019 03:15	43.8	57.0	41.1
05/07/2019 15:00	51.1	64.6	49.0	06/07/2019 03:30	43.5	58.4	41.4
05/07/2019 15:15	50.6	61.2	48.2	06/07/2019 03:45	43.8	55.3	41.6
05/07/2019 15:30	53.0	73.7	48.4	06/07/2019 04:00	44.5	62.4	41.5
05/07/2019 15:45	55.2	69.2	48.3	06/07/2019 04:15	43.5	53.7	41.3
05/07/2019 16:00	63.0	82.2	48.9	06/07/2019 04:30	42.8	51.3	41.3
05/07/2019 16:15	60.0	74.5	49.0	06/07/2019 04:45	43.7	62.8	41.2
05/07/2019 16:30	56.6	72.4	48.5	06/07/2019 05:00	43.6	54.6	41.3
05/07/2019 16:45	56.5	68.5	49.1	06/07/2019 05:15	43.1	57.3	41.1
05/07/2019 17:00	55.5	67.0	49.4	06/07/2019 05:30	43.5	52.6	41.0
05/07/2019 17:15	54.6	73.9	51.0	06/07/2019 05:45	44.0	58.9	41.2
05/07/2019 17:30	52.5	70.6	50.3	06/07/2019 06:00	44.3	60.5	41.2
05/07/2019 17:45	61.0	74.9	50.4	06/07/2019 06:15	43.8	59.8	40.4
05/07/2019 18:00	57.4	71.1	48.8	06/07/2019 06:30	43.9	55.7	41.3
05/07/2019 18:15	49.4	65.4	46.2	06/07/2019 06:45	44.3	61.5	41.1
05/07/2019 18:30	53.2	72.5	48.0	06/07/2019 07:00	44.1	57.5	41.9
05/07/2019 18:45	50.2	67.2	46.1	06/07/2019 07:15	46.2	62.8	42.0
05/07/2019 19:00	47.3	62.4	45.5	06/07/2019 07:30	45.3	59.2	42.1
05/07/2019 19:15	49.8	63.3	45.8	06/07/2019 07:45	44.5	53.9	42.4
05/07/2019 19:30	48.1	59.5	46.2	06/07/2019 08:00	44.5	59.8	41.8
05/07/2019 19:45	48.9	66.0	46.4	06/07/2019 08:15	47.2	65.4	42.7
05/07/2019 20:00	47.2	58.0	45.5	06/07/2019 08:30	47.6	62.3	43.6
05/07/2019 20:15	47.2	54.6	45.6	06/07/2019 08:45	48.2	71.0	43.8
05/07/2019 20:30	47.7	65.6	45.4	06/07/2019 09:00	49.4	64.4	45.0
05/07/2019 20:45	47.2	58.5	45.3	06/07/2019 09:15	48.9	63.3	44.5
05/07/2019 21:00	47.5	58.0	45.5	06/07/2019 09:30	53.2	72.7	43.9
05/07/2019 21:15	47.3	58.8	45.4	06/07/2019 09:45	47.7	68.7	44.1
05/07/2019 21:30	47.6	61.0	45.4	06/07/2019 10:00	61.6	83.2	45.9
05/07/2019 21:45	46.5	56.4	44.7	06/07/2019 10:15	58.3	70.2	50.2
05/07/2019 22:00	47.6	64.9	44.9	06/07/2019 10:30	52.7	71.8	48.3
05/07/2019 22:15	47.0	59.7	44.1	06/07/2019 10:45	62.4	74.7	49.6
05/07/2019 22:30	48.7	63.4	44.3	06/07/2019 11:00	60.4	76.2	50.3
05/07/2019 22:45	45.2	61.2	43.5	06/07/2019 11:15	64.2	81.3	49.4
05/07/2019 23:00	46.3	68.8	43.1	06/07/2019 11:30	61.0	74.5	50.5
05/07/2019 23:15	46.6	60.2	43.6	06/07/2019 11:45	60.9	76.5	50.4
05/07/2019 23:30	46.1	62.7	43.3	06/07/2019 12:00	56.0	75.9	49.4
05/07/2019 23:45	44.9	55.5	43.0	06/07/2019 12:15	57.5	74.9	49.3
06/07/2019 00:00	45.6	56.3	43.1	06/07/2019 12:30	58.1	79.4	49.2
06/07/2019 00:15	46.0	62.9	43.1	06/07/2019 12:45	57.8	77.0	49.4
06/07/2019 00:30	45.8	62.1	42.4	06/07/2019 13:00	57.7	76.2	49.0
06/07/2019 00:45	45.9	60.5	42.4	06/07/2019 13:15	57.5	73.1	48.3
06/07/2019 01:00	44.3	59.5	42.2	06/07/2019 13:30	55.8	73.1	48.5
06/07/2019 01:15	44.6	57.3	42.2	06/07/2019 13:45	53.7	77.7	49.0
06/07/2019 01:30	44.9	54.8	42.2	06/07/2019 14:00	52.0	76.8	48.5
06/07/2019 01:45	45.6	65.8	42.2	06/07/2019 14:15	52.4	70.2	45.6
06/07/2019 02:00	45.2	62.3	42.1	06/07/2019 14:30	52.2	69.8	45.5
06/07/2019 02:15	44.5	62.5	42.0	06/07/2019 14:45	48.4	60.4	45.7
06/07/2019 02:30	44.8	61.5	41.4	06/07/2019 15:00	54.9	76.0	46.0
06/07/2019 02:45	42.9	54.0	41.3	06/07/2019 15:15	56.5	69.2	45.2

Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
06/07/2019 15:30	50.4	65.8	45.4	07/07/2019 03:30	43.2	55.9	41.3
06/07/2019 15:45	55.6	74.2	46.0	07/07/2019 03:45	43.8	55.4	41.3
06/07/2019 16:00	52.9	76.0	45.6	07/07/2019 04:00	46.2	56.0	42.3
06/07/2019 16:15	52.5	69.0	45.8	07/07/2019 04:15	47.9	57.7	45.2
06/07/2019 16:30	47.6	56.3	45.3	07/07/2019 04:30	47.8	58.0	45.1
06/07/2019 16:45	48.9	65.3	45.3	07/07/2019 04:45	46.2	59.5	44.4
06/07/2019 17:00	49.3	65.4	46.1	07/07/2019 05:00	46.3	55.6	43.6
06/07/2019 17:15	50.9	64.4	45.5	07/07/2019 05:15	44.8	56.1	42.3
06/07/2019 17:30	54.0	73.0	45.2	07/07/2019 05:30	44.1	53.3	42.2
06/07/2019 17:45	49.3	64.8	45.1	07/07/2019 05:45	46.3	71.9	41.9
06/07/2019 18:00	48.7	72.8	44.9	07/07/2019 06:00	43.5	52.2	42.1
06/07/2019 18:15	55.0	76.9	45.5	07/07/2019 06:15	47.8	69.9	44.2
06/07/2019 18:30	47.5	55.7	45.4	07/07/2019 06:30	46.2	59.9	43.3
06/07/2019 18:45	47.7	62.9	45.2	07/07/2019 06:45	45.1	57.2	42.6
06/07/2019 19:00	48.8	66.8	45.7	07/07/2019 07:00	45.5	55.1	43.3
06/07/2019 19:15	48.0	58.3	45.4	07/07/2019 07:15	45.7	54.4	43.8
06/07/2019 19:30	48.2	63.8	45.4	07/07/2019 07:30	45.3	55.7	43.3
06/07/2019 19:45	49.6	67.4	45.4	07/07/2019 07:45	47.0	63.3	43.2
06/07/2019 20:00	49.1	67.5	46.0	07/07/2019 08:00	46.3	60.4	42.7
06/07/2019 20:15	49.6	64.4	45.3	07/07/2019 08:15	44.7	56.4	42.6
06/07/2019 20:30	48.2	69.4	45.4	07/07/2019 08:30	44.4	50.5	42.7
06/07/2019 20:45	47.7	65.9	45.1	07/07/2019 08:45	46.7	61.8	44.1
06/07/2019 21:00	47.4	58.6	45.2	07/07/2019 09:00	45.8	56.8	43.7
06/07/2019 21:15	46.8	60.3	44.4	07/07/2019 09:15	45.2	58.4	43.3
06/07/2019 21:30	47.5	62.7	44.4	07/07/2019 09:30	46.0	61.8	43.0
06/07/2019 21:45	49.9	71.1	44.4	07/07/2019 09:45	45.8	61.8	43.3
06/07/2019 22:00	46.0	56.4	44.3	07/07/2019 10:00	44.8	57.4	42.6
06/07/2019 22:15	47.3	58.1	44.8	07/07/2019 10:15	47.1	63.2	42.7
06/07/2019 22:30	46.7	55.9	44.5	07/07/2019 10:30	45.9	62.8	43.3
06/07/2019 22:45	48.8	66.2	46.0	07/07/2019 10:45	45.9	64.2	43.3
06/07/2019 23:00	49.4	65.2	45.9	07/07/2019 11:00	60.4	82.3	43.9
06/07/2019 23:15	48.0	59.6	45.2	07/07/2019 11:15	45.5	57.9	43.3
06/07/2019 23:30	50.2	65.4	45.1	07/07/2019 11:30	46.9	62.4	43.2
06/07/2019 23:45	48.6	68.8	45.4	07/07/2019 11:45	46.1	52.3	43.8
07/07/2019 00:00	46.9	59.5	44.6	07/07/2019 12:00	45.6	62.7	43.2
07/07/2019 00:15	46.5	62.0	43.5	07/07/2019 12:15	45.1	55.2	43.3
07/07/2019 00:30	45.1	62.6	43.0	07/07/2019 12:30	46.5	59.1	43.4
07/07/2019 00:45	46.2	65.8	42.6	07/07/2019 12:45	48.0	68.3	43.2
07/07/2019 01:00	44.8	61.4	42.0	07/07/2019 13:00	46.5	57.3	43.4
07/07/2019 01:15	45.7	64.0	42.2	07/07/2019 13:15	45.9	56.0	42.9
07/07/2019 01:30	45.1	59.9	42.6	07/07/2019 13:30	49.3	66.3	43.6
07/07/2019 01:45	44.8	59.1	42.1	07/07/2019 13:45	56.4	77.7	44.4
07/07/2019 02:00	44.5	55.1	41.8	07/07/2019 14:00	47.2	63.2	43.9
07/07/2019 02:15	43.5	57.1	41.5	07/07/2019 14:15	47.7	64.0	43.9
07/07/2019 02:30	43.9	56.4	41.3	07/07/2019 14:30	48.7	66.0	44.0
07/07/2019 02:45	45.0	54.6	41.4	07/07/2019 14:45	45.6	60.2	43.5
07/07/2019 03:00	43.4	54.7	41.2	07/07/2019 15:00	46.4	57.2	43.5
07/07/2019 03:15	45.1	64.9	41.0	07/07/2019 15:15	45.5	54.7	43.4

Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
07/07/2019 15:30	45.9	62.9	43.4	08/07/2019 03:30	41.4	51.3	39.8
07/07/2019 15:45	47.2	56.4	44.2	08/07/2019 03:45	41.6	58.0	38.9
07/07/2019 16:00	47.4	65.0	43.7	08/07/2019 04:00	40.9	47.7	39.2
07/07/2019 16:15	46.6	62.9	43.7	08/07/2019 04:15	41.4	55.5	38.8
07/07/2019 16:30	45.6	58.6	43.6	08/07/2019 04:30	41.5	54.0	38.9
07/07/2019 16:45	45.6	55.4	43.4	08/07/2019 04:45	41.2	51.0	39.3
07/07/2019 17:00	45.7	58.8	43.5	08/07/2019 05:00	41.7	55.3	39.4
07/07/2019 17:15	45.6	60.0	43.3	08/07/2019 05:15	44.2	59.0	39.9
07/07/2019 17:30	46.1	57.5	43.5	08/07/2019 05:30	44.6	67.3	39.5
07/07/2019 17:45	55.3	79.5	44.0	08/07/2019 05:45	44.6	63.8	39.9
07/07/2019 18:00	45.9	55.0	44.1	08/07/2019 06:00	44.6	57.2	40.6
07/07/2019 18:15	47.5	62.8	43.6	08/07/2019 06:15	45.1	60.3	40.7
07/07/2019 18:30	46.6	62.3	43.5	08/07/2019 06:30	47.2	60.5	41.8
07/07/2019 18:45	45.7	58.3	43.4	08/07/2019 06:45	44.7	56.3	41.4
07/07/2019 19:00	56.0	76.2	43.8	08/07/2019 07:00	48.5	66.7	42.8
07/07/2019 19:15	46.1	57.9	43.5	08/07/2019 07:15	48.3	62.1	43.4
07/07/2019 19:30	46.1	65.9	43.7	08/07/2019 07:30	49.3	61.5	43.2
07/07/2019 19:45	46.3	69.9	43.0	08/07/2019 07:45	53.9	81.0	43.6
07/07/2019 20:00	46.7	61.8	43.5	08/07/2019 08:00	50.6	74.3	44.5
07/07/2019 20:15	45.6	59.3	43.0	08/07/2019 08:15	51.2	70.1	44.5
07/07/2019 20:30	45.7	56.2	43.1	08/07/2019 08:30	48.5	61.6	44.1
07/07/2019 20:45	47.0	59.5	43.5	08/07/2019 08:45	52.9	74.5	44.4
07/07/2019 21:00	44.9	58.4	42.9	08/07/2019 09:00	50.0	69.9	45.2
07/07/2019 21:15	46.4	63.3	43.0	08/07/2019 09:15	50.4	64.0	45.4
07/07/2019 21:30	45.5	55.9	43.3	08/07/2019 09:30	56.3	72.0	46.6
07/07/2019 21:45	45.1	56.4	43.1	08/07/2019 09:45	60.1	70.5	48.9
07/07/2019 22:00	45.4	55.4	42.7	08/07/2019 10:00	60.9	75.5	47.1
07/07/2019 22:15	48.0	67.1	42.1	08/07/2019 10:15	57.1	73.6	47.3
07/07/2019 22:30	44.2	53.9	42.1	08/07/2019 10:30	56.5	75.6	47.8
07/07/2019 22:45	45.8	55.4	42.9	08/07/2019 10:45	51.6	68.2	46.6
07/07/2019 23:00	44.2	53.4	42.3	08/07/2019 11:00	53.8	67.2	47.3
07/07/2019 23:15	44.2	59.9	41.7	08/07/2019 11:15	60.6	70.8	46.8
07/07/2019 23:30	43.4	53.1	41.2	08/07/2019 11:30	57.8	74.6	47.1
07/07/2019 23:45	44.5	53.7	41.7	08/07/2019 11:45	64.4	75.0	47.5
08/07/2019 00:00	44.0	56.9	40.8	08/07/2019 12:00	62.3	74.0	46.3
08/07/2019 00:15	43.4	58.4	40.5	08/07/2019 12:15	53.1	72.8	47.9
08/07/2019 00:30	43.6	55.1	40.2	08/07/2019 12:30	57.9	71.7	47.3
08/07/2019 00:45	43.9	63.1	40.2	08/07/2019 12:45	60.9	73.9	46.3
08/07/2019 01:00	43.4	57.1	40.0	08/07/2019 13:00	60.5	70.4	46.1
08/07/2019 01:15	43.7	54.1	40.0	08/07/2019 13:15	59.7	73.8	46.2
08/07/2019 01:30	41.8	49.6	40.1	08/07/2019 13:30	56.4	72.8	47.2
08/07/2019 01:45	43.1	58.2	39.6	08/07/2019 13:45	52.8	72.8	47.2
08/07/2019 02:00	42.9	57.1	39.8				
08/07/2019 02:15	41.9	50.4	39.9				
08/07/2019 02:30	42.6	55.6	39.8				
08/07/2019 02:45	47.5	61.9	40.3				
08/07/2019 03:00	42.4	58.6	39.1				
08/07/2019 03:15	42.7	59.0	39.2				

RXYSQ8TY1



Notes
- dBA = A-weighted sound power level (A scale according to IEC).
- Reference acoustic intensity 0dB = 10E-6µW/m²
- Measured according to ISO 3744

Front condensers - with absorptive lining										
Lp d = Lp rev - R + 10 log S - 20 log r - 11- 6 + DI										
Lp rev = SWL + 10 log (4/Rc)										
Room constant Rc = S alpha / (1 - alpha bar)				Octave Band Centre Frequency, Hz						
encl	4	2	1.5	63	125	250	500	1000	2000	4000	**dB(A)**
base	8		stone/concrete	0.0	0.01	0.01	0.02	0.02	0.02	0.02	
top	3.5		stone/concrete	0.0	0.01	0.01	0.02	0.02	0.02	0.02	
sides	2.5		stone/concrete	0.0	0.01	0.01	0.02	0.02	0.02	0.02	
abs lini	9		abs lining	0.3	0.4	0.8	0.9	0.8	0.9	0.8	
door	2		louvre	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
condenser				1.0	1.0	1.0	1.0	1.0	1.0	1.0	
total absorption (A)				5.4	6.3	9.5	11.0	10.1	11.0	10.1	
alpha bar				0.3	0.4	0.6	0.7	0.6	0.7	0.6	
Rc				8.2	10.5	23.3	35.0	27.2	35.0	27.2	
SWL condenser unit				1.0	82.0	72.0	71.0	67.0	64.0	58.0	73.3
Lprev				-2.1	77.8	64.3	61.6	58.7	54.6	49.7	65.8
calculate Lpd @ housing											
R	EEC 270mm			6.0	7.0	10.0	13.0	17.0	19.0	13.0	
S	2		10 log S	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
r	4.50		20 log r	13.1	13.1	13.1	13.1	13.1	13.1	13.1	
-17				-17.0	-17.0	-17.0	-17.0	-17.0	-17.0	-17.0	
DI			6	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lp outside housing 1 unit				-29.2	49.8	33.3	27.5	20.6	14.5	15.6	34.9
				-55.4	33.7	24.7	24.3	20.6	15.7	16.6	
number of units			2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
façade correction				3.0	3.0	3.0	3.0	3.0	3.0	3.0	
total LP all units				-23.2	55.8	39.3	33.5	26.6	20.5	21.6	40.9

Rear condenser - with absorptive lining										
Lp d = Lp rev - R + 10 log S - 20 log r - 11- 6 + DI										
Lp rev = SWL + 10 log (4/Rc)										
Room constant Rc = S alpha / (1 - alpha bar)				Octave Band Centre Frequency, Hz						
encl	2.73	1.65	2.5	63	125	250	500	1000	2000	4000	**dB(A)**
base	4.505		stone/concrete	0.0	0.01	0.01	0.02	0.02	0.02	0.02	
top	4.505		stone/concrete	0.0	0.01	0.01	0.02	0.02	0.02	0.02	
sides	3.95		stone/concrete	0.0	0.01	0.01	0.02	0.02	0.02	0.02	
abs lini	7		abs lining	0.3	0.4	0.8	0.9	0.8	0.9	0.8	
door	2		louvre	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
condenser				1.0	1.0	1.0	1.0	1.0	1.0	1.0	
total absorption (A)				4.8	5.5	8.0	9.2	8.5	9.2	8.5	
alpha bar				0.3	0.4	0.5	0.6	0.6	0.6	0.6	
Rc				7.1	8.8	17.1	23.6	19.5	23.6	19.5	
SWL condenser unit				1.0	82.0	72.0	71.0	67.0	64.0	58.0	73.3
Lprev				-1.5	78.6	65.7	63.3	60.1	56.3	51.1	67.0
calculate Lpd @ housing											
R	EEC 270mm			6.0	7.0	10.0	13.0	17.0	19.0	13.0	
S	2		10 log S	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
r	6.00		20 log r	15.6	15.6	15.6	15.6	15.6	15.6	15.6	
-17				-17.0	-17.0	-17.0	-17.0	-17.0	-17.0	-17.0	
DI			6	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lp outside housing 1 unit				-31.1	48.0	32.1	26.7	19.6	13.7	14.6	33.4
				-57.3	31.9	23.5	23.5	19.6	14.9	15.6	
number of units			1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
façade correction				3.0	3.0	3.0	3.0	3.0	3.0	3.0	
total LP all units				-28.1	51.0	35.1	29.7	22.6	16.7	17.6	36.4

Specifications

Outdoor unit				RXYSQ	4T8V	5T8V	6T8V	4T8Y	5T8Y	6T8Y	8TY1	10TY1	12TY1
Capacity range				HP	4	5	6	4	5	6	8	10	12
Heating capacity	Nom.	6°CWB		kW	12.1	14.0	15.5	12.1	14.0	15.5	22.4	28.0	33.5
	Max.	6°CWB		kW	14.2	16.0	18.0	14.2	16.0	18.0	25.0	31.5	37.5
Power input - 50Hz	Heating	Nom.	6°CWB	kW	2.68	3.27	3.97	2.68	3.27	3.97	5.20	6.60	8.19
		Max.	6°CWB	kW	3.43	4.09	5.25	3.43	4.09	5.25	6.22	8.33	10.2
COP at nom. capacity	6°CWB			kW/kW	4.52	4.28	3.90	4.52	4.28	3.90	4.31	4.24	4.09
COP at max. capacity	6°CWB			kW/kW	4.14	3.91	3.43	4.14	3.91	3.43	4.02	3.78	3.66
ESEER - Automatic					7.89	7.49	6.73	7.89	7.49	6.73	6.72	6.41	6.18
Maximum number of connectable indoor units					64 (1)								
Indoor index connection	Min.				50	62.5	70	50	62.5	70	100	125	150
	Nom.				-								
	Max.				130	162.5	182	130	162.5	182	260	325	390
Dimensions	Unit	HeightxWidthxDepth		mm	1,345x900x320						1,430x940x320	1,615x940x460	
Weight	Unit			kg	104						144	175	180
Fan	Air flow rate	Cooling	Nom.	m^3/min	106						140	182	
Sound power level	Cooling	Nom.		dBA	68	69	70	68	69	70	73	74	76
Sound pressure level	Cooling	Nom.		dBA	50	51		50	51		55		57
Operation range	Cooling	Min.~Max.		°CDB	-5~46						-5~52		
	Heating	Min.~Max.		°CWB	-20~15.5								
Refrigerant	Type				R-410A								
	GWP				2,087.5								
	Charge			TCO_2eq	7.5						9.4	14.6	16.7
				kg	3.6						5.5	7	8
Piping connections	Liquid	OD		mm	9.52								12.7
	Gas	OD		mm	15.9		19.1	15.9		19.1		22.2	25.4
	Total piping length	System	Actual	m	300						-		
Power supply	Phase/Frequency/Voltage			Hz/V	1N~/50/220-240			3N~/50/380-415					
Current - 50Hz	Maximum fuse amps (MFA)			A	32			16			25		32

(1) Actual number of units depends on the indoor unit type (VRV DX indoor, RA DX indoor, etc.) and the connection ratio restriction for the system (being; 50% ≤ CR ≤130%). | The automatic ESEER value corresponds with normal VRV IV-S heat pump operation, including the advanced energy saving functionality (variable refrigerant temperature control). | From 01/01/2018 LOT21 data will be available

VRV IV S-series

Keep a low profile

VRV IV S-series units are an ideal solution when outdoor space is restricted because they are easy to hide, thus minimising both visual and sound impact. Their design overcomes the challenges that aesthetics and regulations can impose.

Most **compact unit** on the market:
Height: 823mm
Weight: 88kg

Space saving

The lowest unit in the market

The VRV IV S-series compact units fit easily behind low walls because they are the lowest on the market with a height of less than 1m, including the supporting legs.

Compact:
Easy for a two person crew to move and install.

Seasonal efficiency

The VRV IV S-series units have the best seasonal efficiency in the class, reducing both energy consumption and costs.

Subtle

The Daikin VRV IV S-series units are ideal for installation on a balcony or behind a parapet as they are front blow units which eliminates the need for any ducting saving on installation costs.