

Project:	Gas Holder Site, Reading	SMA Ref:	7335
Subject:	Supporting a non-material amendment to Planning Consent Ref. 190627		
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1.0 INTRODUCTION

- 1.1. Stuart Michael Associates Limited (SMA) have been appointed by Danescroft (the Applicant) to support a non-material amendment (NMA) for the consented development (Ref: 190627) at the Gas Holder Site at Alexander Turner Close, Reading.
- 1.2. Outline planning permission was granted for the “Demolition of existing buildings and Gas Holder and the erection of new buildings ranging between 2 and 9 storeys in height, providing 130 residential units (Class C3) with associated access, car parking, landscaping and open space”.
- 1.3. This technical note has been produced to support an NMA, taking into account the changes to the ‘energy strategy’ within the planning application for *“Proposed non material amendment to planning permission ref. 190627 (Demolition of existing buildings and Gas Holder and the erection of new buildings ranging between 2 and 9 storeys in height, providing 130 residential units (Class C3) with associated access, carparking, landscaping and open space) for proposed changes to design to address updated Building Regulations on fire safety, changes to the energy strategy for the development and changes to unit mix for the residential development at the above Site”* (Ref. 240303).
- 1.4. Changes to the heating strategy for the development include the removal of gas boilers and replacing them with exhaust air heat pump (EAHP) equipped hot water cylinders and mechanical ventilation and heat recovery (MVHR). MVHR was proposed as part of the noise mitigation strategy for the consented development and will be extended to all plots. This does not change the proposed noise mitigation strategy.
- 1.5. Planning condition 11 states that:

“The development hereby permitted shall not be occupied until the glazing, ventilation and any other mitigation specified is installed in accordance with the specifications recommended within the Stuart Michael Associates Noise Assessment ref. 5757/NA Issues 01 dated April 2019 received by the Local Planning Authority on 17th April 2019. The specified mitigation measures shall be permanently retained and maintained in accordance with the approved specifications thereafter. The noise from the ventilation system shall not cause internal levels to exceed the design target noise levels in BS8233.

REASON: In order to protect the amenity of future occupants of the proposed development in accordance with Policy CC8 of the Reading Borough Local Plan 2019."

- 1.6. A Noise Assessment Report (Ref. 5757/NA Issue 01) which included an assessment of the potential impacts and constraints on development from road and rail traffic noise and local noise sources was submitted as part of the Planning Application. Section 7 sets out potential mitigation measures required to achieve internal noise levels to Reading Borough Council (RBC), British Standards (BS) and World Health Organisation (WHO) guidelines for the development where appropriate.
- 1.7. Within the mitigation section of the noise assessment report, it was recommended that appropriate glazed windows with an SRI of between 27 dB (4/12/4 sealed unit) and 36 dB (4/12/14 laminated glass) used in a wall with an SRI of 55 dB results in appropriate façade sound reduction.
- 1.8. It was also recommended that ventilating the apartments through the use of a mechanical ventilation and heat recovery system (MVHR) which negates the need to open the window to provide background ventilation to the apartment. MVHR systems are available which have multiple settings which can provide different flow rates at the occupant's choice or at pre-set temperatures or humidity levels.
- 1.9. Windows can be opened for purge ventilation or at the occupant's choice.
- 1.10. The Applicant has advised that the 'energy strategy' includes mechanical ventilation and heat recovery (MVHR) in all the dwellings across the Site.

2.0 DEVELOPMENT MIX

- 2.1. The proposed housing mix for the Gas Holder Site development site is presented in Collado Collins Architects drawing number 16035 "Proposed Site Plan" revision P0-010 as submitted with planning application reference 190627 and a copy is presented in **Appendix 1**. There are 130 residential units comprising one, two and three bedroom apartments.

PREDICTED NOISE LEVELS

- 2.2. A 3D digital noise model (SoundPLAN) was been used to calculate the daytime and night time noise levels across the proposed development for the predicted year of completion (2030). The model incorporates proposed site layout, railway and road traffic flows and LiDAR data have been used to predict the noise levels and produce noise contour plots for the development site. The footprints and number of storeys of the buildings have been obtained from the drawing presented in Appendix 1.

2.3. All the proposed buildings have been modelled and the results for all façades and floors are presented in **Appendix 2**. The daytime and night time noise profiles are presented in **Figure 1** and **Figure 2** respectively.

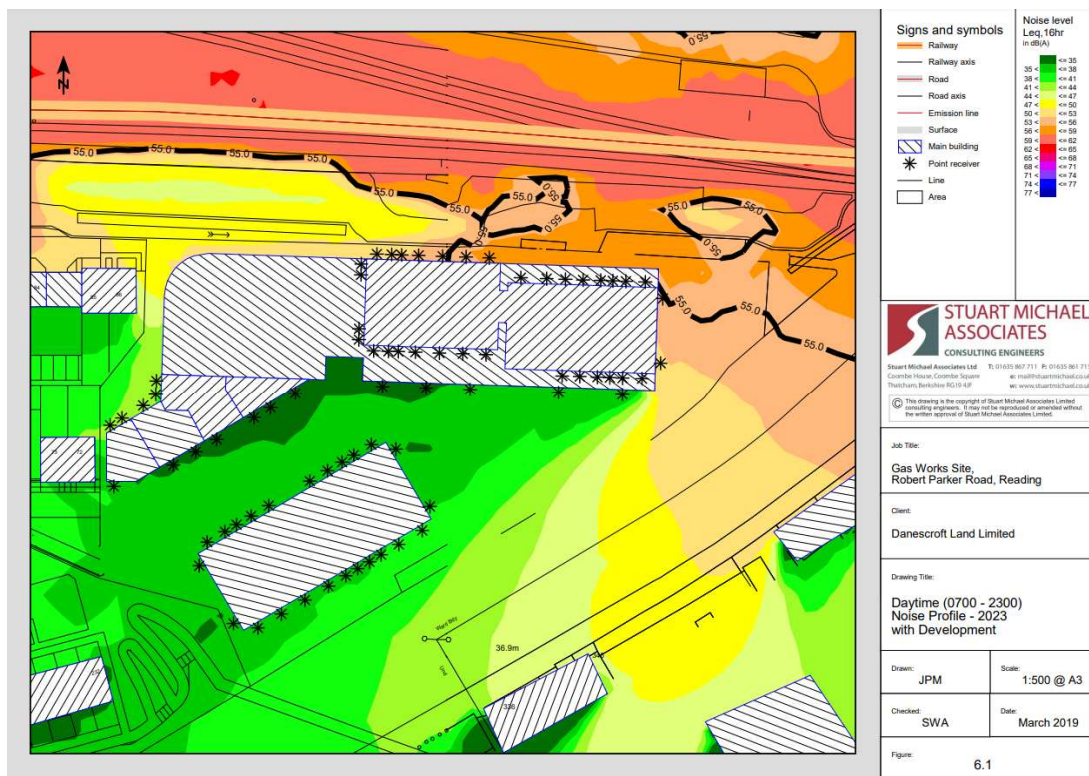


Figure 1: Daytime Noise Profile

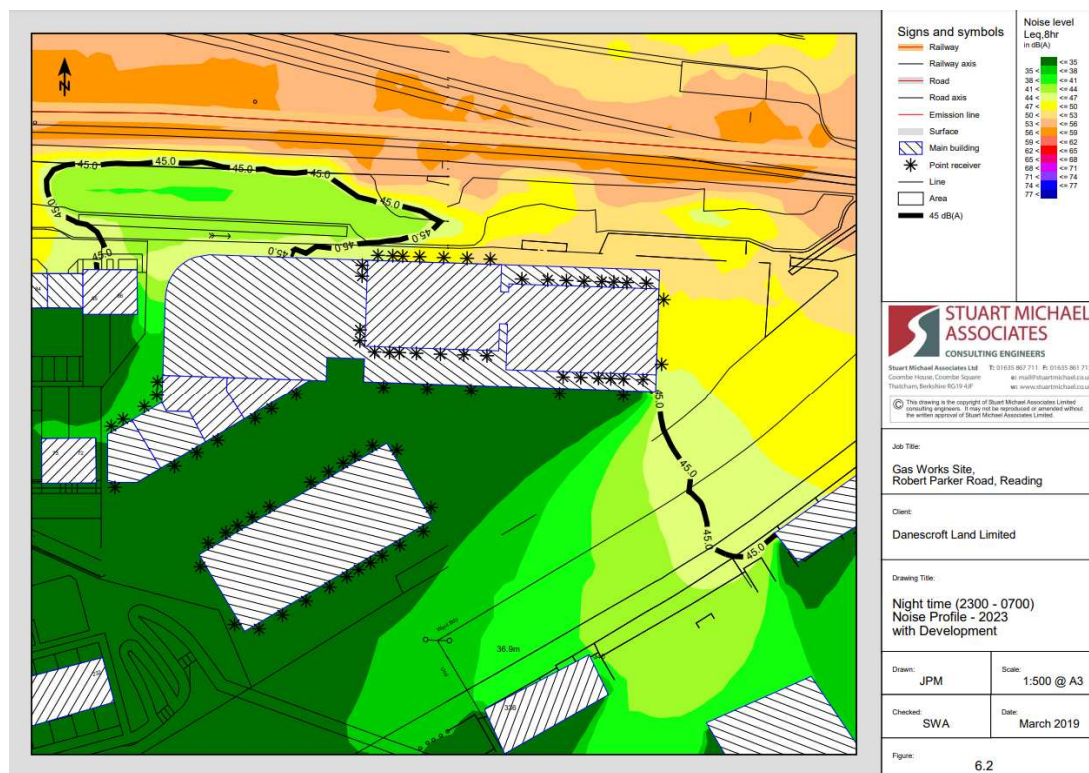


Figure 2: Night Time Noise Profile

2.4. For the purposes of the noise assessment, all façades with habitable rooms have been numbered individually and these are presented in **Figure 3**.

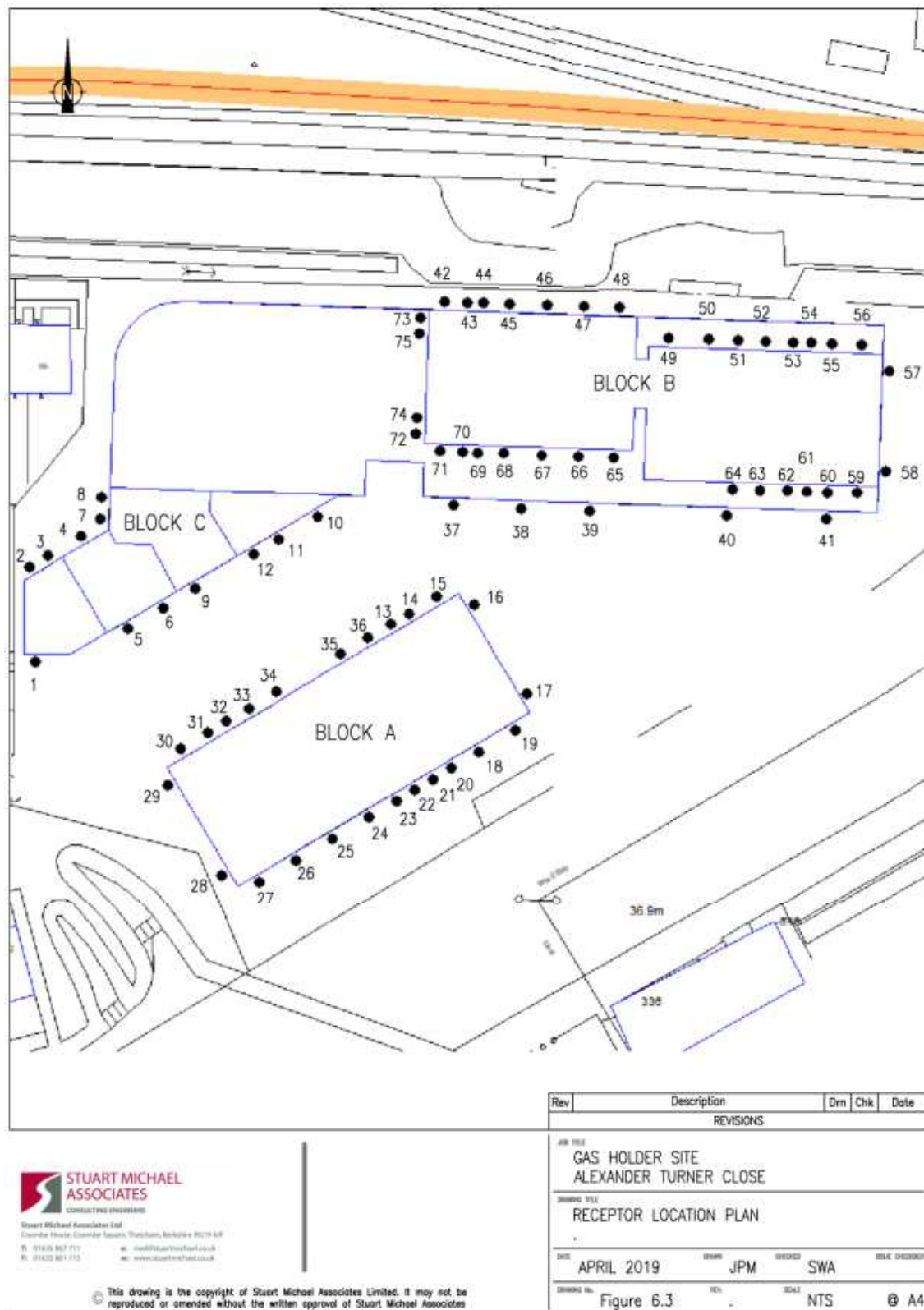


Figure 3: Noise Assessment Plot Number Plan

- 2.5. Presented in **Table 1** are the predicted minimum and maximum façade noise levels at the Apartments in Block A.

Table 1: Predicted façade noise levels at Apartments in Block A

Plot Number		Façade Direction	'Future' situation	
			Daytime $L_{eq,16hr}$ dB(A)	Night Time $L_{eq,8hr}$ dB(A)
Block A	Min	SE	41	35
	Max	SE	44	38
	Min	NW	39	33
	Max	NW	52	47
	Min	NE	39	33
	Max	NE	49	44
	Min	SW	38	32
	Max	SW	49	44
KEY: N = North, S = South, E = East, W = West				

- 2.6. With reference to Appendix 2 and Table 1 it can be seen that during the daytime, all façades at all floors are predicted to experience noise levels below 50 dB except at the top floor of the northwest façade. During the night time, all façades at all floors are predicted to experience noise levels below 45 dB except at the top floor of the northwest façade.
- 2.7. Presented in **Table 2** are the predicted ground floor and first floor façade noise levels of the proposed Dwellings on the southern side of Block B.

Table 2: Predicted façade noise levels at ground floor and first floor Levels in Block B

Plot Number		Façade Direction	'Future' situation	
			Daytime $L_{eq,16hr}$ dB(A)	Night Time $L_{eq,8hr}$ dB(A)
Block B – Ground Floor and 1 st Floor	Min	S	37	32
	Max	S	38	32
	Min	S	38	32
	Max	S	38	33
KEY: N = North, S = South, E = East, W = West				

- 2.8. From Table 2 it can be seen that the façade noise levels are predicted to be well below 50 dB during the daytime and 45 dB during the night time.

2.9. Presented in **Table 3** are the predicted minimum and maximum façade noise levels at the Apartments in Block B.

Table 3: Predicted façade noise levels at the second floor to the top floor of Apartments in Block B

Plot Number		Façade Direction	'Future' situation	
			Daytime $L_{eq,16hr}$ dB(A)	Night Time $L_{eq,8hr}$ dB(A)
Block B – 2 nd to Top Floor	MIN	N	59	53
	MAX	N	60	55
	MIN	E	55	50
	MAX	E	59	53
	MIN	S	38	32
	MAX	S	45	39
	MIN	W	51	45
	MAX	W	59	53
KEY: N = North, S = South, E = East, W = West				

2.10. With reference to Table 3 and Appendix 2, it can be seen that at the northern boundary, daytime façade noise levels on the northern, eastern and western façades of Block B are predicted to be between 51 and 60 dB. At night, façade noise levels are predicted to be between 45 and 55 dB.

2.11. Daytime façade noise levels on the southern façade of Block B are predicted to be between 38 and 45 dB. At night, façade noise levels are predicted to be between 32 dB and 39 dB.

2.12. Presented in **Table 4** are the predicted minimum and maximum façade noise levels of the proposed Apartments in Block C.

Table 4: Predicted façade noise levels at Apartments in Block C

Plot Number		Façade Direction	'Future' situation	
			Daytime $L_{eq,16hr}$ dB(A)	Night Time $L_{eq,8hr}$ dB(A)
Block C	MIN	NW	44	38
	MAX	NW	52	46
	MIN	S	40	34
	MAX	S	43	37
	MIN	SE	36	31
	MAX	SE	38	33
	MIN	W	44	38
	MAX	W	52	46
KEY: N = North, S = South, E = East, W = West				

- 2.13. With reference to Table 4 and Appendix 2, it can be seen that during the daytime all façades are predicted to be below 50 dB. However, the NW and W façades at second floor level are predicted to experience noise levels above 50 dB.
- 2.14. As with the daytime, at night all façades are predicted to be below 45 dB. However, the NW and W façades at second floor level are predicted to experience noise levels above 45 dB.
- 2.15. Plots fronting or with an unobstructed view of the railway line are predicted to be between 51 dB and 60 dB during the daytime. During the night time, façade noise levels are predicted to be between 45 dB and 54 dB.
- 2.16. Notwithstanding the above, maximum noise levels from trains passing the site were recorded as 75 dB which will need to be considered on the top floor of Block A and C and the north façade of Block B.
- 2.17. Presented in the following table are the receptors where internal noise levels are not below 30 dB during the night time (sleeping) and below 35 dB during the daytime (resting) in bedrooms with the windows open.

Table 5: Predicted façade noise levels at Apartments in Block C

Receptor Number	Floor	Name	Façade Direction	2030	
				LrD	LrN
2	F 2	Block C	NW	52	46
3	F 2	Block C	NW	52	46
4	F 2	Block C	NW	52	46
7	F 2	Block C	W	51	45
8	F 2	Block C	W	52	46
13	F 4	Block A	NW	52	47
14	F 4	Block A	NW	52	47
15	F 4	Block A	NW	52	46
30	F 4	Block A	NW	51	46
31	F 4	Block A	NW	51	46
32	F 4	Block A	NW	51	46
33	F 4	Block A	NW	52	46
34	F 4	Block A	NW	52	46
35	F 4	Block A	NW	52	47
36	F 4	Block A	NW	52	47
42 to 58	GF	Block B - 2nd to Top Floor	N	59	53
	F 1	Block B - 2nd to Top Floor	N	60	54
	F 2	Block B - 2nd to Top Floor	N	60	54
	F 3	Block B - 2nd to Top Floor	N	60	54
	F 4	Block B - 2nd to Top Floor	N	60	54
	F 5	Block B - 2nd to Top Floor	N	59	54
	F 6	Block B - 2nd to Top Floor	N	59	53
72 to 75	GF	Block B - 2nd to Top Floor	W	51	45
	F 1	Block B - 2nd to Top Floor	W	54	49
	F 2	Block B - 2nd to Top Floor	W	55	49
	F 3	Block B - 2nd to Top Floor	W	55	50
	F 4	Block B - 2nd to Top Floor	W	55	50
	F 5	Block B - 2nd to Top Floor	W	55	50
	F 6	Block B - 2nd to Top Floor	W	55	50

3.0 PROPOSED MITIGATION

Windows

- 3.1. Presented in the following paragraphs are the highest predicted façade noise levels during the daytime and night time. The required sound reduction index (SRI) of a façade to achieve an internal daytime noise level ($L_{eq,16hr}$) in living rooms and bedrooms and an internal night time ($L_{eq,8hr}$) noise level in bedrooms has been calculated. Also considered is the required SRI of a façade to mitigate maximum noise levels ($L_{max,F}$) from railway traffic during the night time.
- 3.2. For this purpose the buildings have been split into Block A, Block B, Block B 2nd Floor to Top Floor and Block C.

Train Noise

Block A - Apartments

- 3.3. The highest façade noise level at Block A during the night time (2300 - 0700) is predicted to be 47 dB at top floor (F 4) apartments, on the north western façade (refer to Table 1 and Appendix 2) which is above the roof level of Block C and faces the railway line. To achieve internal noise level of 30 dB ($L_{Aeq,8hr}$) during the night time a sound reduction index (SRI) of 17 dB would be required ($47 - 30 = 17$).
- 3.4. During the daytime (0700 - 2300), the highest façade noise levels is predicted to be 52 dB at top floor (F 4) apartments, on the north western façade (refer to Table 1 and Appendix 2) which is above the roof level of Block C and faces the railway line. To achieve reasonable resting conditions in bedrooms and living rooms during the daytime an SRI of 17 dB would be required ($52 - 35 = 17$).

Block B – Ground Floor and First Floor Levels

- 3.5. The highest façade noise level at Block B (Ground Floor and First Floor) during the night time (2300 - 0700) is predicted to be 33 dB at first floor (F 1) level, on the southern façade (refer to Table 2 and Appendix 2) which overlooks the public open space. To achieve an internal noise level of 30 dB ($L_{Aeq,8hr}$) during the night time a sound reduction index (SRI) of 3 dB would be required ($33 - 30 = 3$).
- 3.6. During the daytime (0700 - 2300), the highest façade noise levels is predicted to be 38 dB at ground floor and first floor (GF and F 1) level, on the southern façade (refer to Table 2 and Appendix 2) which overlooks the public open space. To achieve reasonable resting conditions in bedrooms and living rooms during the daytime an SRI of 3 dB would be required ($38 - 35 = 3$).

Block B – 2nd Floor to Top Floor Apartments

- 3.7. The highest façade noise level at Block B (2nd Floor to Top Floor Apartments) during the night time (2300 - 0700) is predicted to be 55 dB at 2nd floor, 3rd floor and 4th floor (F 2, F 3 and F 4) apartments, on the northern façade (refer to Table 3 and Appendix 2) which overlooks the railway line. To achieve an internal noise level of 30 dB ($L_{Aeq,8hr}$) during the night time a sound reduction index (SRI) of 30 dB would be required ($55 - 30 = 30$).
- 3.8. During the daytime (0700 - 2300), the highest façade noise levels is predicted to be 60 dB at 2nd floor, 3rd floor, 4th floor, 5th floor and 6th floor (F 2, F 3, F 4, F 5 and F 6) apartments, on the northern façade (refer to Table 3 and Appendix 2) which overlooks the railway line. To achieve reasonable resting conditions in bedrooms and living rooms during the daytime an SRI of 25 dB would be required ($60 - 35 = 25$).

Block C - Apartments

- 3.9. The highest façade noise level at Block C during the night time (2300 - 0700) is predicted to be 46 dB at 2nd floor (F 2) apartments, on the north western façade (refer to Table 4 and Appendix 2) which faces the adjacent development and the railway line. To achieve an internal noise level of 30 dB ($L_{Aeq,8hr}$) during the night time a sound reduction index (SRI) of 16 dB would be required ($46 - 30 = 16$).
- 3.10. During the daytime (0700 - 2300), the highest façade noise levels is predicted to be 52 dB at 2nd floor (F 2) apartments, on the northern façade (refer to Table 4 and Appendix 2) which faces the adjacent development and the railway line. To achieve reasonable resting conditions in bedrooms and living rooms during the daytime an SRI of 17 dB would be required ($52 - 35 = 17$).

Train Noise (maximum levels)

- 3.11. Regarding mitigating maximum noise levels, we would recommend using a window with a Sound Reduction Index (SRI) of 37 dB (32 dB C_{tr}). A window configuration 6-20-4 (glass-air gap-glass) would provide an SRI of 37 dB and if the window is manufactured to the correct specifications and installed to manufacturer's guidelines should provide acceptable living conditions. An example window is provided in Appendix 3.
- 3.12. Where the façade is not mentioned in the preceding paragraphs, a window with an SRI of 29 dB and configuration 4-16-4 (glass-air gap-glass) would suffice. An example window is provided in Appendix 3.

Ventilation

- 3.13. The 'energy strategy' includes decentralised mechanical ventilation and heat recovery system (MVHR) in all the apartments across the Site. It is recommended that ventilating the apartments through the use of an MVHR which negates the need to open the window to provide background ventilation to the apartment. MVHR systems are available which have multiple settings which can provide different flow rates at the occupant's choice or at pre-set temperatures or humidity levels.
- 3.14. A typical product as recommended in the 'energy strategy' is the Decentralised Nuaire MRXBOXAB-ECO3-AE MVHR unit and specifications are presented in Appendix 4. The MVHR system will be designed in accordance to Building Regulations and internal noise levels in bedrooms will not exceed NR30 during the night time and NR35 during the daytime.
- 3.15. To provide purge ventilation the future occupants will be able to open the windows.

Hot Water Heat Pumps

- 3.16. In accordance with the 'energy strategy', hot water will be supplied to each apartment via a system such as the Dimplex Edel RF Hot Water Heat Pump and an example specification is presented in **Appendix 5**. The system consists of a stainless steel inner vessel with a hot water heat pump mounted on top. The heat pump produces hot water very efficiently by extracting heat from external air supplied via insulated ductwork from the MVHR.
- 3.17. According to the manufacturers specifications, the heat pump is "Very quiet in operation due to soundproof hood housing, variable speed fan and the rotary compressor being mounted on anti-vibration pads."
- 3.18. The hot water system will be designed in accordance to Building Regulations and internal noise levels in bedrooms will not exceed NR30 during the night time and NR35 during the daytime.

Balconies

- 3.19. It is recommended that at private terraces/balconies the use of purpose built glass/Perspex barriers to provide noise protection and help reduce noise levels to acceptable levels.

Outdoor Amenity Areas (public space)

- 3.20. With regard to mitigation for noise levels in the outside amenity areas, the construction of the proposed buildings, and boundary treatments such as brick walls or acoustic fences will help reduce noise levels in these areas. For example, in the shadow zone of a building, noise levels could be reduced by up to 10 dB.
- 3.21. It has been demonstrated previously the construction of the proposed buildings will shield the amenity areas from external noise sources to a degree that predicted noise levels are well below the BS8233 and WHO guideline level of 50 dB.

4.0 COMMENTARY AND CONCLUSION

- 4.1. The noise assessment for the consented development (planning reference 190627) recommended using mechanical ventilation and heat recovery as part of the noise mitigation strategy to plots fronting the railway line. The updated 'energy strategy' (planning reference 240303) proposes mechanical ventilation and heat recovery (MVHR) throughout the development. The proposed changes to the 'energy strategy' do not change the proposed noise mitigation strategy.
- 4.2. Based on the compliance noise assessment, thermal double glazed window units with a minimum configuration of 6/20/4 and 4/16/4 are to be fitted to ensure internal noise levels in habitable rooms are below the guidance levels.
- 4.3. MVHR is to be fitted to all apartments as part of the energy strategy and will provide ventilation in accordance with Building Regulations negating the need to open the windows to provide background ventilation.
- 4.4. MVHR and the hot water cylinders with heat pumps will be designed in accordance to Building Regulations and internal noise levels in bedrooms will not exceed NR30 during the night time and NR35 during the daytime - as conditioned in planning condition 11 (refer to paragraph 1.5) *"The noise from the ventilation system shall not cause internal levels to exceed the design target noise levels in BS8233"*.
- 4.5. Public amenity areas are predicted to have an area which is below 50 dB $L_{Aeq,T}$ as illustrated on Figure 1.
- 4.6. In conclusion, noise levels in the public space will be below 50 dB during the daytime and it is considered that with the proposed glazing specification and MVHR presented in this report, internal and external noise levels would be below the daytime guidance levels of 35 dB in living rooms and bedrooms (resting) and night time guidance levels of 30 dB in bedrooms and are therefore considered appropriate to comply with Planning Condition 11.

5.0 APPENDICES

Appendix 1 – Proposed Site Plan

Appendix 2 – Predicted Façade Noise Levels

Receptor Number	Floor	Block Name	Façade Direction	Predicted Façade Noise Levels		Do the internal noise levels comply with BS8233 or WHO with an open window?	
				LrD	LrN		
				dB(A)		Day	Night
1	GF	Block C	S	40	34	✓	✓
	F 1	Block C	S	42	35	✓	✓
	F 2	Block C	S	43	37	✓	✓
2	GF	Block C	NW	44	38	✓	✓
	F 1	Block C	NW	48	42	✓	✓
	F 2	Block C	NW	52	46		
3	GF	Block C	NW	44	38	✓	✓
	F 1	Block C	NW	48	42	✓	✓
	F 2	Block C	NW	52	46		
4	GF	Block C	NW	44	38	✓	✓
	F 1	Block C	NW	47	42	✓	✓
	F 2	Block C	NW	52	46		
5	GF	Block C	SE	36	31	✓	✓
	F 1	Block C	SE	37	31	✓	✓
	F 2	Block C	SE	38	33	✓	✓
6	GF	Block C	SE	36	31	✓	✓
	F 1	Block C	SE	37	31	✓	✓
	F 2	Block C	SE	38	33	✓	✓
7	GF	Block C	W	44	38	✓	✓
	F 1	Block C	W	47	41	✓	✓
	F 2	Block C	W	51	45		
8	GF	Block C	W	44	38	✓	✓
	F 1	Block C	W	47	42	✓	✓
	F 2	Block C	W	52	46		
9	GF	Block C	SE	36	31	✓	✓
	F 1	Block C	SE	36	31	✓	✓
	F 2	Block C	SE	38	33	✓	✓
10	GF	Block C	SE	37	31	✓	✓
	F 1	Block C	SE	37	31	✓	✓
	F 2	Block C	SE	38	33	✓	✓
11	GF	Block C	SE	37	31	✓	✓
	F 1	Block C	SE	37	31	✓	✓
	F 2	Block C	SE	38	33	✓	✓
12	GF	Block C	SE	37	31	✓	✓
	F 1	Block C	SE	37	31	✓	✓
	F 2	Block C	SE	38	33	✓	✓
KEY: S = South, N = North, E = East, W = West, GF = Ground Floor, F 1 = First Floor, F 2 = Second Floor, F 3 = Third Floor and F 4 = Fourth Floor							

Receptor Number	Floor	Block Name	Façade Direction	Predicted Façade Noise Levels		Do the internal noise levels comply with BS8233 or WHO with an open window?	
				LrD	LrN		
				dB(A)		Day	Night
13	GF	Block A	NW	39	34	✓	✓
	F 1	Block A	NW	42	36	✓	✓
	F 2	Block A	NW	45	40	✓	✓
	F 3	Block A	NW	49	43	✓	✓
	F 4	Block A	NW	52	47		
14	GF	Block A	NW	39	34	✓	✓
	F 1	Block A	NW	42	36	✓	✓
	F 2	Block A	NW	46	40	✓	✓
	F 3	Block A	NW	49	44	✓	✓
	F 4	Block A	NW	52	47		
15	GF	Block A	NW	40	34	✓	✓
	F 1	Block A	NW	42	36	✓	✓
	F 2	Block A	NW	46	40	✓	✓
	F 3	Block A	NW	49	44	✓	✓
	F 4	Block A	NW	52	46		
16	GF	Block A	NE	39	33	✓	✓
	F 1	Block A	NE	41	35	✓	✓
	F 2	Block A	NE	45	39	✓	✓
	F 3	Block A	NE	48	42	✓	✓
	F 4	Block A	NE	49	44	✓	✓
17	GF	Block A	NE	41	35	✓	✓
	F 1	Block A	NE	43	37	✓	✓
	F 2	Block A	NE	44	38	✓	✓
	F 3	Block A	NE	45	40	✓	✓
	F 4	Block A	NE	46	40	✓	✓
18	GF	Block A	SE	42	36	✓	✓
	F 1	Block A	SE	42	37	✓	✓
	F 2	Block A	SE	43	37	✓	✓
	F 3	Block A	SE	43	38	✓	✓
	F 4	Block A	SE	44	38	✓	✓
19	GF	Block A	SE	42	36	✓	✓
	F 1	Block A	SE	43	37	✓	✓
	F 2	Block A	SE	43	37	✓	✓
	F 3	Block A	SE	44	38	✓	✓
	F 4	Block A	SE	44	38	✓	✓
KEY: S = South, N = North, E = East, W = West, GF = Ground Floor, F 1 = First Floor, F 2 = Second Floor, F 3 = Third Floor and F 4 = Fourth Floor							

Receptor Number	Floor	Block Name	Façade Direction	Predicted Façade Noise Levels		Do the internal noise levels comply with BS8233 or WHO with an open window?	
				LrD	LrN		
				dB(A)		Day	Night
20	GF	Block A	SE	42	36	✓	✓
	F 1	Block A	SE	42	37	✓	✓
	F 2	Block A	SE	43	37	✓	✓
	F 3	Block A	SE	43	37	✓	✓
	F 4	Block A	SE	44	38	✓	✓
21	GF	Block A	SE	41	36	✓	✓
	F 1	Block A	SE	42	37	✓	✓
	F 2	Block A	SE	42	37	✓	✓
	F 3	Block A	SE	43	37	✓	✓
	F 4	Block A	SE	43	38	✓	✓
22	GF	Block A	SE	41	36	✓	✓
	F 1	Block A	SE	42	36	✓	✓
	F 2	Block A	SE	42	37	✓	✓
	F 3	Block A	SE	43	37	✓	✓
	F 4	Block A	SE	43	38	✓	✓
23	GF	Block A	SE	41	36	✓	✓
	F 1	Block A	SE	42	36	✓	✓
	F 2	Block A	SE	42	37	✓	✓
	F 3	Block A	SE	43	37	✓	✓
	F 4	Block A	SE	43	38	✓	✓
24	GF	Block A	SE	41	35	✓	✓
	F 1	Block A	SE	41	36	✓	✓
	F 2	Block A	SE	42	36	✓	✓
	F 3	Block A	SE	42	36	✓	✓
	F 4	Block A	SE	43	37	✓	✓
25	GF	Block A	SE	41	35	✓	✓
	F 1	Block A	SE	41	36	✓	✓
	F 2	Block A	SE	42	36	✓	✓
	F 3	Block A	SE	42	36	✓	✓
	F 4	Block A	SE	43	37	✓	✓
26	GF	Block A	SE	41	35	✓	✓
	F 1	Block A	SE	41	36	✓	✓
	F 2	Block A	SE	41	36	✓	✓
	F 3	Block A	SE	42	36	✓	✓
	F 4	Block A	SE	43	37	✓	✓
KEY: S = South, N = North, E = East, W = West, GF = Ground Floor, F 1 = First Floor, F 2 = Second Floor, F 3 = Third Floor and F 4 = Fourth Floor							

Receptor Number	Floor	Block Name	Façade Direction	Predicted Façade Noise Levels		Do the internal noise levels comply with BS8233 or WHO with an open window?	
				LrD	LrN		
				dB(A)		Day	Night
27	GF	Block A	SE	41	35	✓	✓
	F 1	Block A	SE	41	35	✓	✓
	F 2	Block A	SE	41	36	✓	✓
	F 3	Block A	SE	42	36	✓	✓
	F 4	Block A	SE	42	37	✓	✓
28	GF	Block A	SW	38	32	✓	✓
	F 1	Block A	SW	40	34	✓	✓
	F 2	Block A	SW	42	36	✓	✓
	F 3	Block A	SW	44	38	✓	✓
	F 4	Block A	SW	46	41	✓	✓
29	GF	Block A	SW	39	33	✓	✓
	F 1	Block A	SW	41	35	✓	✓
	F 2	Block A	SW	43	37	✓	✓
	F 3	Block A	SW	46	40	✓	✓
	F 4	Block A	SW	49	44	✓	✓
30	GF	Block A	NW	39	33	✓	✓
	F 1	Block A	NW	41	35	✓	✓
	F 2	Block A	NW	43	37	✓	✓
	F 3	Block A	NW	47	41	✓	✓
	F 4	Block A	NW	51	46		
31	GF	Block A	NW	39	33	✓	✓
	F 1	Block A	NW	41	35	✓	✓
	F 2	Block A	NW	43	37	✓	✓
	F 3	Block A	NW	47	41	✓	✓
	F 4	Block A	NW	51	46		
32	GF	Block A	NW	39	33	✓	✓
	F 1	Block A	NW	41	35	✓	✓
	F 2	Block A	NW	43	37	✓	✓
	F 3	Block A	NW	47	41	✓	✓
	F 4	Block A	NW	51	46		
33	GF	Block A	NW	39	33	✓	✓
	F 1	Block A	NW	41	35	✓	✓
	F 2	Block A	NW	43	37	✓	✓
	F 3	Block A	NW	47	41	✓	✓
	F 4	Block A	NW	52	46		
KEY: S = South, N = North, E = East, W = West, GF = Ground Floor, F 1 = First Floor, F 2 = Second Floor, F 3 = Third Floor and F 4 = Fourth Floor							

Receptor Number	Floor	Block Name	Façade Direction	Predicted Façade Noise Levels		Do the internal noise levels comply with BS8233 or WHO with an open window?	
				LrD	LrN		
				dB(A)		Day	Night
34	GF	Block A	NW	39	33	✓	✓
	F 1	Block A	NW	41	35	✓	✓
	F 2	Block A	NW	43	37	✓	✓
	F 3	Block A	NW	47	41	✓	✓
	F 4	Block A	NW	52	46		
35	GF	Block A	NW	39	33	✓	✓
	F 1	Block A	NW	41	35	✓	✓
	F 2	Block A	NW	44	38	✓	✓
	F 3	Block A	NW	48	42	✓	✓
	F 4	Block A	NW	52	47		
36	GF	Block A	NW	39	33	✓	✓
	F 1	Block A	NW	42	36	✓	✓
	F 2	Block A	NW	45	39	✓	✓
	F 3	Block A	NW	49	43	✓	✓
	F 4	Block A	NW	52	47		
KEY: S = South, N = North, E = East, W = West, GF = Ground Floor, F 1 = First Floor, F 2 = Second Floor, F 3 = Third Floor and F 4 = Fourth Floor							

Receptor Number	Floor	Block Name	Façade Direction	Predicted Façade Noise Levels		Do the internal noise levels comply with BS8233 or WHO with an open window?	
				LrD	LrN		
				dB(A)		Day	Night
37	GF	Block B - Ground and 1st Floor	S	37	32	✓	✓
	F 1	Block B - Ground and 1st Floor	S	38	32	✓	✓
38	GF	Block B - Ground and 1st Floor	S	37	32	✓	✓
	F 1	Block B - Ground and 1st Floor	S	38	32	✓	✓
39	GF	Block B - Ground and 1st Floor	S	38	32	✓	✓
	F 1	Block B - Ground and 1st Floor	S	38	33	✓	✓
40	GF	Block B - Ground and 1st Floor	S	38	32	✓	✓
	F 1	Block B - Ground and 1st Floor	S	38	33	✓	✓
41	GF	Block B - Ground and 1st Floor	S	38	32	✓	✓
	F 1	Block B - Ground and 1st Floor	S	38	33	✓	✓
42	GF	Block B - 2nd to Top Floor	N	59	53		
	F 1	Block B - 2nd to Top Floor	N	60	54		
	F 2	Block B - 2nd to Top Floor	N	60	54		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	60	54		
	F 5	Block B - 2nd to Top Floor	N	59	54		
43	GF	Block B - 2nd to Top Floor	N	59	54		
	F 1	Block B - 2nd to Top Floor	N	60	54		
	F 2	Block B - 2nd to Top Floor	N	60	54		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	60	54		
	F 5	Block B - 2nd to Top Floor	N	59	54		
44	GF	Block B - 2nd to Top Floor	N	60	54		
	F 1	Block B - 2nd to Top Floor	N	60	55		
	F 2	Block B - 2nd to Top Floor	N	60	55		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	60	54		
	F 5	Block B - 2nd to Top Floor	N	59	54		
	F 6	Block B - 2nd to Top Floor	N	59	53		
KEY: S = South, N = North, E = East, W = West, GF = Ground Floor, F 1 = First Floor, F 2 = Second Floor, F 3 = Third Floor, F 4 = Fourth Floor, F 5 = Fifth Floor and F 6 = Sixth Floor							

Receptor Number	Floor	Block Name	Façade Direction	Predicted Façade Noise Levels		Do the internal noise levels comply with BS8233 or WHO with an open window?	
				LrD	LrN		
				dB(A)		Day	Night
45	GF	Block B - 2nd to Top Floor	N	59	54		
	F 1	Block B - 2nd to Top Floor	N	60	54		
	F 2	Block B - 2nd to Top Floor	N	60	54		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	59	53		
	F 5	Block B - 2nd to Top Floor	N	59	53		
	F 6	Block B - 2nd to Top Floor	N	59	53		
46	GF	Block B - 2nd to Top Floor	N	60	54		
	F 1	Block B - 2nd to Top Floor	N	60	55		
	F 2	Block B - 2nd to Top Floor	N	60	55		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	60	54		
	F 5	Block B - 2nd to Top Floor	N	59	54		
	F 6	Block B - 2nd to Top Floor	N	59	53		
47	GF	Block B - 2nd to Top Floor	N	60	54		
	F 1	Block B - 2nd to Top Floor	N	60	55		
	F 2	Block B - 2nd to Top Floor	N	60	55		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	60	54		
	F 5	Block B - 2nd to Top Floor	N	59	54		
	F 6	Block B - 2nd to Top Floor	N	59	53		
48	GF	Block B - 2nd to Top Floor	N	60	55		
	F 1	Block B - 2nd to Top Floor	N	60	55		
	F 2	Block B - 2nd to Top Floor	N	60	55		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	60	54		
	F 5	Block B - 2nd to Top Floor	N	59	54		
	F 6	Block B - 2nd to Top Floor	N	59	53		
49	GF	Block B - 2nd to Top Floor	N	59	54		
	F 1	Block B - 2nd to Top Floor	N	60	54		
	F 2	Block B - 2nd to Top Floor	N	60	54		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	59	54		
	F 5	Block B - 2nd to Top Floor	N	59	53		
	F 6	Block B - 2nd to Top Floor	N	59	53		
KEY: S = South, N = North, E = East, W = West, GF = Ground Floor, F 1 = First Floor, F 2 = Second Floor, F 3 = Third Floor, F 4 = Fourth Floor, F 5 = Fifth Floor and F 6 = Sixth Floor							

Receptor Number	Floor	Block Name	Façade Direction	Predicted Façade Noise Levels		Do the internal noise levels comply with BS8233 or WHO with an open window?	
				LrD	LrN		
				dB(A)		Day	Night
50	GF	Block B - 2nd to Top Floor	N	60	54		
	F 1	Block B - 2nd to Top Floor	N	60	54		
	F 2	Block B - 2nd to Top Floor	N	60	54		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	59	54		
	F 5	Block B - 2nd to Top Floor	N	59	53		
	F 6	Block B - 2nd to Top Floor	N	59	53		
51	GF	Block B - 2nd to Top Floor	N	60	54		
	F 1	Block B - 2nd to Top Floor	N	60	55		
	F 2	Block B - 2nd to Top Floor	N	60	54		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	59	54		
	F 5	Block B - 2nd to Top Floor	N	59	54		
	F 6	Block B - 2nd to Top Floor	N	59	53		
52	GF	Block B - 2nd to Top Floor	N	60	54		
	F 1	Block B - 2nd to Top Floor	N	60	55		
	F 2	Block B - 2nd to Top Floor	N	60	54		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	59	54		
	F 5	Block B - 2nd to Top Floor	N	59	54		
	F 6	Block B - 2nd to Top Floor	N	59	53		
53	GF	Block B - 2nd to Top Floor	N	60	54		
	F 1	Block B - 2nd to Top Floor	N	60	55		
	F 2	Block B - 2nd to Top Floor	N	60	54		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	59	54		
	F 5	Block B - 2nd to Top Floor	N	59	54		
	F 6	Block B - 2nd to Top Floor	N	59	53		
54	GF	Block B - 2nd to Top Floor	N	60	54		
	F 1	Block B - 2nd to Top Floor	N	60	55		
	F 2	Block B - 2nd to Top Floor	N	60	54		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	59	54		
	F 5	Block B - 2nd to Top Floor	N	59	54		
	F 6	Block B - 2nd to Top Floor	N	59	53		
KEY: S = South, N = North, E = East, W = West, GF = Ground Floor, F 1 = First Floor, F 2 = Second Floor, F 3 = Third Floor, F 4 = Fourth Floor, F 5 = Fifth Floor and F 6 = Sixth Floor							

Receptor Number	Floor	Block Name	Façade Direction	Predicted Façade Noise Levels		Do the internal noise levels comply with BS8233 or WHO with an open window?	
				LrD	LrN		
				dB(A)		Day	Night
55	GF	Block B - 2nd to Top Floor	N	60	54		
	F 1	Block B - 2nd to Top Floor	N	60	55		
	F 2	Block B - 2nd to Top Floor	N	60	54		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	60	54		
	F 5	Block B - 2nd to Top Floor	N	59	54		
	F 6	Block B - 2nd to Top Floor	N	59	53		
56	GF	Block B - 2nd to Top Floor	N	60	54		
	F 1	Block B - 2nd to Top Floor	N	60	55		
	F 2	Block B - 2nd to Top Floor	N	60	54		
	F 3	Block B - 2nd to Top Floor	N	60	54		
	F 4	Block B - 2nd to Top Floor	N	60	54		
	F 5	Block B - 2nd to Top Floor	N	59	54		
	F 6	Block B - 2nd to Top Floor	N	59	53		
57	GF	Block B - 2nd to Top Floor	E	59	53		
	F 1	Block B - 2nd to Top Floor	E	59	53		
	F 2	Block B - 2nd to Top Floor	E	59	53		
	F 3	Block B - 2nd to Top Floor	E	58	53		
	F 4	Block B - 2nd to Top Floor	E	58	53		
	F 5	Block B - 2nd to Top Floor	E	58	52		
	F 6	Block B - 2nd to Top Floor	E	57	52		
58	GF	Block B - 2nd to Top Floor	E	56	50		
	F 1	Block B - 2nd to Top Floor	E	56	50		
	F 2	Block B - 2nd to Top Floor	E	56	50		
	F 3	Block B - 2nd to Top Floor	E	56	50		
	F 4	Block B - 2nd to Top Floor	E	56	50		
	F 5	Block B - 2nd to Top Floor	E	56	50		
	F 6	Block B - 2nd to Top Floor	E	55	50		
59	GF	Block B - 2nd to Top Floor	S	43	37	✓	✓
	F 1	Block B - 2nd to Top Floor	S	43	37	✓	✓
	F 2	Block B - 2nd to Top Floor	S	43	38	✓	✓
	F 3	Block B - 2nd to Top Floor	S	43	38	✓	✓
	F 4	Block B - 2nd to Top Floor	S	44	38	✓	✓
	F 5	Block B - 2nd to Top Floor	S	44	38	✓	✓
	F 6	Block B - 2nd to Top Floor	S	44	38	✓	✓
KEY: S = South, N = North, E = East, W = West, GF = Ground Floor, F 1 = First Floor, F 2 = Second Floor, F 3 = Third Floor, F 4 = Fourth Floor, F 5 = Fifth Floor and F 6 = Sixth Floor							

Receptor Number	Floor	Block Name	Façade Direction	Predicted Façade Noise Levels		Do the internal noise levels comply with BS8233 or WHO with an open window?	
				LrD	LrN		
				dB(A)		Day	Night
60	GF	Block B - 2nd to Top Floor	S	39	34	✓	✓
	F 1	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 2	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 3	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 4	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 5	Block B - 2nd to Top Floor	S	41	36	✓	✓
	F 6	Block B - 2nd to Top Floor	S	42	36	✓	✓
61	GF	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 1	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 2	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 3	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 4	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 5	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 6	Block B - 2nd to Top Floor	S	41	36	✓	✓
62	GF	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 1	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 2	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 3	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 4	Block B - 2nd to Top Floor	S	40	35	✓	✓
	F 5	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 6	Block B - 2nd to Top Floor	S	41	35	✓	✓
63	GF	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 1	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 2	Block B - 2nd to Top Floor	S	39	34	✓	✓
	F 3	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 4	Block B - 2nd to Top Floor	S	40	35	✓	✓
	F 5	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 6	Block B - 2nd to Top Floor	S	41	35	✓	✓
64	GF	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 1	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 2	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 3	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 4	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 5	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 6	Block B - 2nd to Top Floor	S	41	35	✓	✓
KEY: S = South, N = North, E = East, W = West, GF = Ground Floor, F 1 = First Floor, F 2 = Second Floor, F 3 = Third Floor, F 4 = Fourth Floor, F 5 = Fifth Floor and F 6 = Sixth Floor							

Receptor Number	Floor	Block Name	Façade Direction	Predicted Façade Noise Levels		Do the internal noise levels comply with BS8233 or WHO with an open window?	
				LrD	LrN		
				dB(A)		Day	Night
65	GF	Block B - 2nd to Top Floor	S	38	32	✓	✓
	F 1	Block B - 2nd to Top Floor	S	38	32	✓	✓
	F 2	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 3	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 4	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 5	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 6	Block B - 2nd to Top Floor	S	41	35	✓	✓
66	GF	Block B - 2nd to Top Floor	S	38	32	✓	✓
	F 1	Block B - 2nd to Top Floor	S	38	32	✓	✓
	F 2	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 3	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 4	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 5	Block B - 2nd to Top Floor	S	41	34	✓	✓
	F 6	Block B - 2nd to Top Floor	S	41	35	✓	✓
67	GF	Block B - 2nd to Top Floor	S	38	32	✓	✓
	F 1	Block B - 2nd to Top Floor	S	38	32	✓	✓
	F 2	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 3	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 4	Block B - 2nd to Top Floor	S	41	34	✓	✓
	F 5	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 6	Block B - 2nd to Top Floor	S	41	35	✓	✓
68	GF	Block B - 2nd to Top Floor	S	38	32	✓	✓
	F 1	Block B - 2nd to Top Floor	S	38	33	✓	✓
	F 2	Block B - 2nd to Top Floor	S	39	34	✓	✓
	F 3	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 4	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 5	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 6	Block B - 2nd to Top Floor	S	41	35	✓	✓
KEY: S = South, N = North, E = East, W = West, GF = Ground Floor, F 1 = First Floor, F 2 = Second Floor, F 3 = Third Floor, F 4 = Fourth Floor, F 5 = Fifth Floor and F 6 = Sixth Floor							

Receptor Number	Floor	Block Name	Façade Direction	Predicted Façade Noise Levels		Do the internal noise levels comply with BS8233 or WHO with an open window?	
				LrD	LrN		
				dB(A)		Day	Night
69	GF	Block B - 2nd to Top Floor	S	38	32	✓	✓
	F 1	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 2	Block B - 2nd to Top Floor	S	40	34	✓	✓
	F 3	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 4	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 5	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 6	Block B - 2nd to Top Floor	S	42	35	✓	✓
70	GF	Block B - 2nd to Top Floor	S	38	33	✓	✓
	F 1	Block B - 2nd to Top Floor	S	39	33	✓	✓
	F 2	Block B - 2nd to Top Floor	S	40	35	✓	✓
	F 3	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 4	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 5	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 6	Block B - 2nd to Top Floor	S	42	36	✓	✓
71	GF	Block B - 2nd to Top Floor	S	41	35	✓	✓
	F 1	Block B - 2nd to Top Floor	S	43	37	✓	✓
	F 2	Block B - 2nd to Top Floor	S	44	38	✓	✓
	F 3	Block B - 2nd to Top Floor	S	44	38	✓	✓
	F 4	Block B - 2nd to Top Floor	S	44	38	✓	✓
	F 5	Block B - 2nd to Top Floor	S	44	39	✓	✓
	F 6	Block B - 2nd to Top Floor	S	45	39	✓	✓
72	GF	Block B - 2nd to Top Floor	W	51	45		
	F 1	Block B - 2nd to Top Floor	W	54	49		
	F 2	Block B - 2nd to Top Floor	W	55	49		
	F 3	Block B - 2nd to Top Floor	W	55	50		
	F 4	Block B - 2nd to Top Floor	W	55	50		
	F 5	Block B - 2nd to Top Floor	W	55	50		
	F 6	Block B - 2nd to Top Floor	W	55	50		
73	GF	Block B - 2nd to Top Floor	W	58	52		
	F 1	Block B - 2nd to Top Floor	W	59	53		
	F 2	Block B - 2nd to Top Floor	W	59	53		
	F 3	Block B - 2nd to Top Floor	W	59	53		
	F 4	Block B - 2nd to Top Floor	W	59	53		
	F 5	Block B - 2nd to Top Floor	W	58	53		
	F 6	Block B - 2nd to Top Floor	W	58	52		
KEY: S = South, N = North, E = East, W = West, GF = Ground Floor, F 1 = First Floor, F 2 = Second Floor, F 3 = Third Floor, F 4 = Fourth Floor, F 5 = Fifth Floor and F 6 = Sixth Floor							

Receptor Number	Floor	Block Name	Façade Direction	Predicted Façade Noise Levels		Do the internal noise levels comply with BS8233 or WHO with an open window?	
				LrD	LrN		
				dB(A)		Day	Night
74	GF	Block B - 2nd to Top Floor	W	51	46		
	F 1	Block B - 2nd to Top Floor	W	55	49		
	F 2	Block B - 2nd to Top Floor	W	55	50		
	F 3	Block B - 2nd to Top Floor	W	55	50		
	F 4	Block B - 2nd to Top Floor	W	56	50		
	F 5	Block B - 2nd to Top Floor	W	56	50		
	F 6	Block B - 2nd to Top Floor	W	55	50		
75	GF	Block B - 2nd to Top Floor	W	57	52		
	F 1	Block B - 2nd to Top Floor	W	58	52		
	F 2	Block B - 2nd to Top Floor	W	58	52		
	F 3	Block B - 2nd to Top Floor	W	58	52		
	F 4	Block B - 2nd to Top Floor	W	58	52		
	F 5	Block B - 2nd to Top Floor	W	57	52		
	F 6	Block B - 2nd to Top Floor	W	57	51		
KEY: S = South, N = North, E = East, W = West, GF = Ground Floor, F 1 = First Floor, F 2 = Second Floor, F 3 = Third Floor, F 4 = Fourth Floor, F 5 = Fifth Floor and F 6 = Sixth Floor							

Appendix 3 – Example windows

Glass Guide

- choosing the right type of glass



Creating solutions the Ideal way.

idealcombi
Enhancing windows

Abbreviations

Ug-value - Insulation property

The Ug-value is measured in the centre of the unit and is referred to as the centre point value

The value is stated as: W/m^2K (Watt per $m^2 \times$ Kelvin).

A low figure means that the unit offers good protection against heat loss.

LT-value - Light transmission

The value is stated in percent expressing the amount of light which is admitted through the glass.

A high figure indicates a high degree of light transmission.

g-value - TST

(Total Solar Energy Transmittance or Solar Energy Transmission)

The value is stated in percent expressing the amount of solar energy (thermal energy) which is admitted through the glass.

A high figure indicates a large admittance of solar energy.

LRout - Outward light reflection

Reflection is stated in percent as the part of the light which is reflected outward. (For comparison inward reflection is stated as LRin)

A high figure indicates major reflection when viewed from outside.

Tuv- Transmission of ultraviolet radiation

Transmission is stated in percent as the part of the sun's ultraviolet rays which is admitted through the glass.

A low figure indicates that the uv-rays have a low impact on objects inside the building which minimises fading.

Rw dB - Sound reduction

Reduction is stated in decibel and describes the glass' ability to reduce discomforting noise.

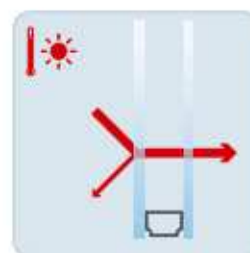
A high figure indicates a high degree of sound reduction. The figure is not calculated as a percentage reduction, but as a fixed figure in relation to the structure of the unit.



Ug-value



LT-value



g-value



LRout-value



Tuv-value



Rw dB-value

Glass guide

Solar reflective glass

Solar reflective glass reduces the amount of thermal energy and/or light which is admitted through the unit. This type of glass is often used for large surfaces where the aim is to make full use of the sunlight while at the same time keeping out the solar heat. In other cases both the sun and the heat is kept out.

The g-value is the amount of the sun's thermal energy which the glass allows to pass into a room. The transmission of daylight is called the LT-value.

Solar reflective glass is available in a variety of options; colour neutral, coloured and with various degrees of reflection. All these factors determine the amount of light and heat which is admitted through the glass. If you choose solar reflective glass for aesthetic reasons the design is entirely up to you. In all other cases it depends on how highly you value low solar energy transmission in relation to high light admittance.

Acoustic insulating glass

Acoustic insulating glass reduces uncomfortable noise from heavy traffic and regular city noise. It is the distance between the unit's individual glass panes and the panes' individual thickness that helps define the unit's acoustic insulating properties.

When selecting the right type of acoustic glass, it is important to determine the source of the noise you want to reduce.

The acoustic insulation of the unit is stated in decibel, R_w , as a sound reduction figure. The figure indicates by how many decibel the unit reduces external noise - depending on the source of the noise. It is also important to keep in mind that R_w is a weighted value representing the entire sound frequency spectrum. Different sounds represent different frequencies in the spectrum. The R_w -value is consequently a mere base for the calculation of the actual reduction of any given noise.

Facts

Solar reflective glass absorbs a lot of solar energy. This is why the glass is toughened to eliminate the risk of thermal fractures.



Facts

The thicker the glass, the better the sound reduction
Glass of various thicknesses boosts sound reduction
The larger the distance between the panes, the better the sound reduction

Here are some examples of noise levels:

Whisper	30 dB
Speech	40-60 dB
Vacuum cleaner	65-75 dB
Car	70-80 dB
Truck	80-90 dB
Air hammer drill	90-110 dB
Jet plane	110-130 dB

Design glass

Design glass can either be patterned and cast, clear or coloured with varying degrees of light transmission and vision control.

The texture or surface of design glass is created using techniques such as embossing, matt grinding, etching, sandblasting or matt lamination. Each of these methods create their own look. Matt grinding produces an effect similar to etching, yet avoids the use of environmentally harmful chemicals.

Design glass is suitable for uses where the blocking of visibility or unwanted views is desired and for creating special and decorative effects.

Idealcombi A/S offers a wide range of different design glass types. Below you can see a selection of our most common glass types with different textures and patterns and visibility options.

Cotswold



Clear Glass C



Sahara/520



Satinato



Matt laminate



Mastercarre



Masterligne



Masterpoint



Safety glass

Personal safety

Safety glass is intended to prevent or minimise the risk of injury in case of human impact.

In places where people can come into contact with both sides of the pane through accidental impact, the requirement for safety glass extends to both layers of glass.

Safety glass is available as laminated and toughened glass both providing increased impact protection.

The plastic film in laminated glass holds the glass pieces together thus preventing serious injury.

When toughened glass breaks, it shatters into many small blunt pieces which reduces the risk of serious injury.

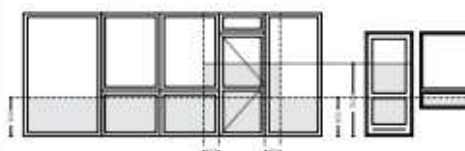
Laminated glass

Laminated glass is a combination of two or more layers of glass with an interlayer of plastic film. The glass is heated until the plastic film melts and bonds with the glass forming a transparent pane.

Toughened glass

Toughened glass is heated to very high temperatures creating compressive stress in the surface of the glass. The treatment makes the glass able to withstand severe impacts such as kicking or people tripping and hitting the glass.

Facts



Always choose personal safety glass if part of the unit is placed less than 1.50 metres above the floor in doors and door side-lights and access points.

The same applies to other risk areas where the unit is placed less than 0.8 metres above a particular surface.

Guidelines for safety glass are described in BS 6206:1981 and BS 6262-4:1994.



Glass guide

Security glass

Burglary and vandalism

Security glass is intended to prevent or delay passage through the unit following a physical attack.

Security glass can offer protection against vandalism committed using objects such as hammers, axes and bricks or falling material, against planned intrusion (such as burglary) and against gunfire attacks (bullet-proof glass).

Security glass is made from laminated glass or glass which is both laminated and toughened.

Whether you should choose laminated security glass or security glass which is both laminated and toughened depends on what the glass should protect against and how effective the protection should be.

The thickness and number of glass panes as well as the type of film used determine the resistance of the security glass. Several layers of glass with a thicker film provide higher breaking resistance.

Facade glass

Facade glass for spandrels is used for various purposes on large external surfaces. It can also be used between floors and on surfaces where a blocking of the view is required.

Idealcombi A/S can supply facade glass as single glazing units or as double glazing units for spandrels.

Facade glass can be divided into three visual functions:

- Matching facades
- Look-a-like facades
- Contrast facades

Matching facades, if you want a calm and harmonious relationship with facade materials such as windows and spandrels. Usually enamelled or silk-printed glass is used.

Look-a-like facades, if you want optimum similarity in the reflection of facade glass and double glazing units. Coated glass types are normally used for these types of facades.

Contrast facades, if you want to create a contrast between facade glass and double glazing units. This can be done using coloured glass in various combinations of colour for a mosaic effect. Enamelled glass is typically used here.

Facts

The requirements for security glass are always equal to laminated glass. The thicker the glass and film and the more layers, the more effective the protection.

Security glass against manual attack is classified in accordance with BS EN 356:2002

Security glass against bullet attack is classified in accordance with BS EN 1063:2000.



Facts

"Look-a-like" facades

In order to produce reflection, the area behind the glass must be darker than the area in front of the glass.

The greater the difference in light on the inside/outside, the greater the reflection in the windows.

Look-a-like therefore occurs in the daytime – in the evening light conditions change and the reflection is reduced or disappears.



Units with integrated blind

Units with integrated blind are a combination of a double glazing unit and a Venetian blind.

The blind is sandwiched between two layers of glass and is isolated from the inside as well as the outside environment. The blind is operated by a single cord which both turns the strips and draws them up and down, depending on the type of blind.

The blind provides effective protection against solar heat. If kept shut completely, it works just like the third layer of a triple glazing unit.

Units with integrated blinds also have the advantage of being able to partially or completely block unwanted views whenever desired.

The blind requires no cleaning, is hygienic and suitable for use in for instance hospitals and surgeries.

It also saves energy for heating, air conditioning and maintenance/repairs of an external or internal blind.

Fire protective glass

Fire protective glass must provide efficient protection against flames and fumes. Certain types of fire protective glass can also reduce or stop the direct radiation heat and provide effective insulation. Ideal-combi A/S⁺ fire protective glass can do just that.

The more layers of fire protective material, the longer it takes for the fire to penetrate the glass and the slower the rise in temperature on the other side of the glass. This is why it is a good idea to choose fire protective glass with at least three interlayers of protective material. Particularly for situations where radiation heat may set material on the other side of the glass on fire, or in situations where you want to secure an escape route.

Facts

- Shields against sunlight
- Shields against heat
- No cleaning
- Saves energy for heating and air-conditioning



Facts

The fire penetration time is directly proportional to the number of fire protective interlayers.

Reducing radiation heat prolongs the clearance period, minimises the spread of the fire and the cost of fire damage.

Fire protective glass is classified in accordance with BS EN 357:2001.

The total glass/window structure, i.e. the glass, the glass fitting method, the frame/sash design and mounting system must be approved by proper authorities in order to meet the classification requirements in the various fire classes.



Glass guide

Clear demands on function

When choosing the right type of glass you will probably have to consider many – and perhaps even conflicting – requirements and wishes.

The most common requirements are for:

- A low Ug-value, as it provides good insulation, reduced energy consumption and a high surface temperature resulting in less cold down-draughts and cold radiation.
- Light transmission which is defined according to the need for admitting a lot of daylight or for keeping it out. You may either want a very natural light which also reduces the cost of artificial lighting or you may want to prevent reflections in for instance computer screens.
- Solar energy transmission which is defined according to the need for a high thermal energy admittance versus a low thermal energy admittance. A high thermal energy admittance reduces heating costs while a low thermal energy admittance prevents for instance large offices from becoming too hot and also reduces air-conditioning costs.

Preferably, a window solution should be able to satisfy all three requirements, with the highest values possible while at the same time considering the reflection, colour and appearance of the pane.

The checklist can give you an idea of your options and the requirements you may have for the glass when choosing a window.

Warranties on glass, see pages 248-249.

Define:

- ☐ Insulation properties, Ug-value
- ☐ Light transmission, LT-value
- ☐ Solar energy transmission, g-value
- ☐ Fire protection
- ☐ Noise control
- ☐ Personal safety
- ☐ Security class
- ☐ Aesthetics



Tables

Energy units

Glazing	Composition	Dim.	Gas	Ug-value	LT %	g %	LR _{out} %	Rw (C;Ctr)dB
IC Low-E	4-16-4 (S3)	24	Argon	1,13	80	61	13	29 (-1;-4)
IC Low-E	6-14-4 (S3)	24	Argon	1,2	79	59	13	35 (-1;-5)
IC Low-E	6-12-6 (S3)	24	Argon	1,3	78	59	13	31 (-1;-4)
IC Low-E	8-12-4 (S3)	24	Argon	1,3	78	57	12	36 (-2;-5)
IC Low-E	4-20-4 (S3)	28	Argon	1,15	80	61	13	*
IC Low-E	6-18-4 (S3)	28	Argon	1,1	79	59	13	36 (-2;-5)
IC Low-E	6-16-6 (S3)	28	Argon	1,1	78	59	13	31 (-1;-4)
IC Low-E	8-16-4 (S3)	28	Argon	1,1	78	57	12	37 (-2;-6)
IC Low-E	4-22-4 (S3)	30	Argon	1,2	79	61	13	*
IC Low-E	6-20-4 (S3)	30	Argon	1,1	79	59	13	37 (-1;-5)
IC Low-E	6-18-6 (S3)	30	Argon	1,1	78	59	13	*
IC Low-E	8-18-4 (S3)	30	Argon	1,1	77	57	12	*
IC Low-E	4-24-4 (S3)	32	Argon	1,17	80	61	13	*
IC Low-E	6-22-4 (S3)	32	Argon	1,2	79	59	13	*
IC Low-E	6-20-6 (S3)	32	Argon	1,1	78	59	13	*
IC Low-E	8-20-4 (S3)	32	Argon	1,1	78	57	12	37 (-3;-7)
IC Low-E	4-10-4-10-4 (2xS3)	32	Argon	0,8	71	50	18	*
IC Low-E	4-10-4-10-4 (2xS3)	32	Krypton	0,6	71	50	18	*
IC Low-E	6-24-6 (S3)	36	Argon	1,2	78	59	13	*
IC Low-E	8-24-4 (S3)	36	Argon	1,2	78	57	12	37 (-3;-7)
IC Low-E	4-12-4-12-4 (2xS3)	36	Argon	0,7	71	50	18	*
IC Low-E	4-12-4-12-4 (2xS3)	36	Krypton	0,5	71	50	18	*
IC Low-E	4-14-4-14-4 (S3)	40	Argon	0,6	71	50	18	*
IC Low-E	6-12-4-12-6 (S3)	40	Krypton	0,5	70	49	18	*

* No data available for this type of glazing.

Solar reflective glass

Glazing	Composition	Dim.	Gas	U _g -value	LT %	g %	LR _{out} %	R _w (C/Ctr)dB
Suncool 70/40	6-14-4	24	Argon	1.2	71	43	10	35 (-1;-5)
Suncool 70/40	6-12-6	24	Argon	1.3	70	43	10	31 (-1;-4)
Suncool 70/40	6-18-4	28	Argon	1.1	71	43	10	36 (-2;-5)
Suncool 70/40	6-16-6	28	Argon	1.1	70	43	10	31 (-1;-4)
Suncool 70/40	6-20-4	30	Argon	1.2	71	43	10	37 (-1;-5)
Suncool 70/40	6-18-6	30	Argon	1.1	70	43	10	*
Suncool 70/40	6-22-4	32	Argon	1.2	71	43	10	*
Suncool 70/40	6-20-6	32	Argon	1.2	70	43	10	*
Suncool 70/40	6-24-6	36	Argon	1.2	70	43	10	*
Suncool 70/40	6-12-4-12-6 (S3)	40	Krypton	0.5	63	38	13	*
Suncool 66/33	6-14-4	24	Argon	1.1	66	36	15	35 (-1;-5)
Suncool 66/33	6-12-6	24	Argon	1.2	65	36	15	31 (-1;-4)
Suncool 66/33	6-18-4	28	Argon	1.1	66	36	15	36 (-2;-5)
Suncool 66/33	6-16-6	28	Argon	1.1	65	36	15	31 (-1;-4)
Suncool 66/33	6-20-4	30	Argon	1.1	66	36	15	37 (-1;-5)
Suncool 66/33	6-18-6	30	Argon	1.1	65	36	15	*
Suncool 66/33	6-22-4	32	Argon	1.1	66	36	15	*
Suncool 66/33	6-20-6	32	Argon	1.1	66	36	15	*
Suncool 66/33	6-24-6	36	Argon	1.1	65	36	15	*
Suncool 66/33	6-12-4-12-6 (S3)	40	Krypton	0.5	58	32	18	*
Suncool 50/25	6-14-4	24	Argon	1.1	50	27	18	35 (-1;-5)
Suncool 50/25	6-12-6	24	Argon	1.2	49	28	18	31 (-1;-4)
Suncool 50/25	6-18-4	28	Argon	1.1	50	27	18	36 (-2;-5)
Suncool 50/25	6-16-6	28	Argon	1.1	49	27	18	31 (-1;-4)
Suncool 50/25	6-20-4	30	Argon	1.1	50	27	18	37 (-1;-5)
Suncool 50/25	6-18-6	30	Argon	1.1	49	27	18	*
Suncool 50/25	6-22-4	32	Argon	1.1	50	27	18	*
Suncool 50/25	6-20-6	32	Argon	1.1	49	27	18	*
Suncool 50/25	6-24-6	36	Argon	1.1	49	27	18	*
Suncool 50/25	6-12-4-12-6 (S3)	40	Krypton	0.5	44	24	20	*
Cool-lite SKN 178	6-14-4	24	Argon	1.2	70	41	12	35 (-1;-5)
Cool-lite SKN 178	6-12-6	24	Argon	1.3	69	41	12	31 (-1;-4)
Cool-lite SKN 178	6-18-4	28	Argon	1.1	70	41	12	36 (-2;-5)
Cool-lite SKN 178	6-16-6	28	Argon	1.1	69	41	12	31 (-1;-4)
Cool-lite SKN 178	6-20-4	30	Argon	1.1	70	41	12	37 (-1;-5)
Cool-lite SKN 178	6-18-6	30	Argon	1.1	69	41	12	*
Cool-lite SKN 178	6-22-4	32	Argon	1.2	70	41	12	*
Cool-lite SKN 178	6-20-6	32	Argon	1.1	69	41	12	*
Cool-lite SKN 178	6-24-6	36	Argon	1.2	69	41	12	*
Cool-lite SKN 178	6-12-4-12-6 (S3)	40	Krypton	0.5	62	37	14	*

Safety glass

Glazing	Composition**	Dim.	Gas	U _g -value	LT %	g %	LR _{out} %	R _w (C;Ctr)dB
IC SAFETY	6-4-14-4	24	Argon	1,1	78	57	12	*
IC SAFETY	6-4-12-6-4	24	Argon	1,3	73	54	14	*
IC SAFETY	6-4-18-4	28	Argon	1,1	78	57	12	*
IC SAFETY	6-4-16-6-4	28	Argon	1,1	73	54	14	*
IC SAFETY	6-4-20-4	30	Argon	1,1	78	57	12	*
IC SAFETY	6-4-18-6-4	30	Argon	1,1	73	54	14	*
IC SAFETY	6-4-22-4	32	Argon	1,2	78	57	12	*
IC SAFETY	6-4-20-6-4	32	Argon	1,1	73	54	14	*
IC SAFETY	6-4-12-4-10-4	36	Argon	0,8	66	43	17	*
IC SAFETY	6-4-10-4-10-6-4	36	Argon	0,8	62	42	18	*
IC SAFETY	6-4-14-4-12-4	40	Argon	0,7	66	43	17	*
IC SAFETY	6-4-12-4-12-6-4	40	Argon	0,7	62	42	18	*

* No data available for this type of glazing.

** Super low-energy coating on the inner pane



Choosing the right glass

This guide provides a short introduction to the design of double glazing units as well as simple explanations of glass terminology. The guide also includes tables with specifications for some of our most popular units such as energy glass, solar reflective glass, design glass, facade glass, safety glass, fire protective glass and units with integrated blind.



66-68 High Street - Houghton Regis - Beds LU5 5BJ - Tel: 01582 860940 - Fax: 01582 860949 - www.idealcombi.com

Appendix 4 – Example MVHR

MRXBOXAB-ECO3 MRXBOX-ECO3 and Opposite Handed versions

ACHIEVES
100%
DUTY IN BYPASS
MODE

The MRXBOXAB-ECO3 has been designed with automatic 100% bypass as listed on the SAP Product Characteristics Database (PCDB).

Due to its intelligent and smart design, there will be no reduction in airflow when operating in bypass mode resulting in enhanced performance.

Both the MRXBOXAB-ECO3 and the MRXBOX-ECO3 are designed to provide optimised balanced (supply and extract) mechanical ventilation with heat recovery and both listed on the PCDB.

The units operate by continuously extracting moisture-laden air from 'wet' rooms within the property and at the same time drawing in fresh supply air from outside. The heat from the extracted stale air is recovered via a heat exchanger inside the heat recovery unit which becomes tempered then filtered before supplying into the habitable rooms creating comfortable and well ventilated homes.

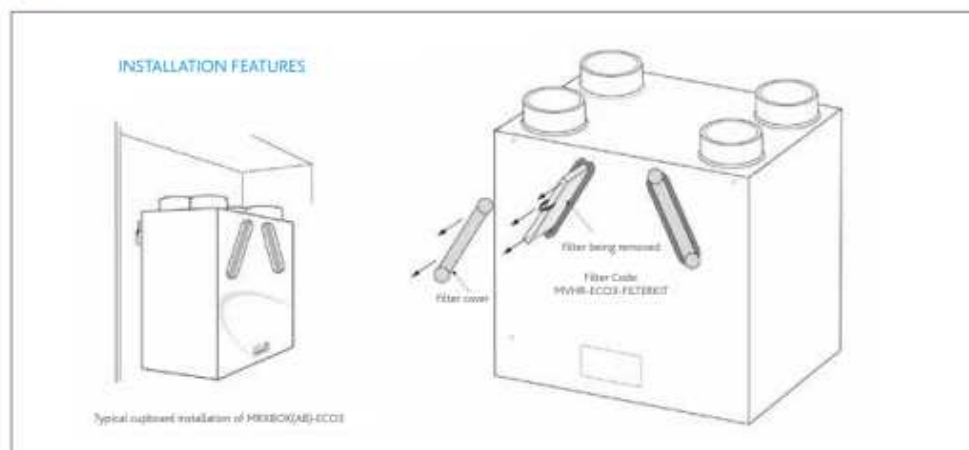
The heat exchanger block within these units can recover up to 95% of the normally wasted heat. The two independent fans have full speed control for background and boost ventilation rates.

The MRXBOXAB-ECO3 has a Summer bypass function. In warmer months this function automatically activates to ensure the property is being well-ventilated and comfort levels are maintained in the home by continuously drawing in fresh filtered air into the habitable rooms.



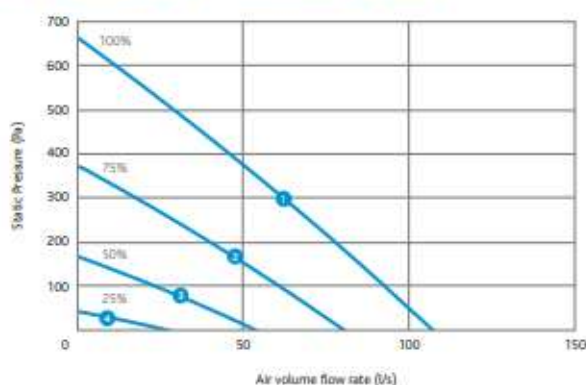
Mounting Brackets on wall and rear of unit

Typical Installation ▼





Performance - MRXBOX(AB)-ECO3 ▼



CODE DESCRIPTION

MRXBOXAB-ECO3

Wall mounted unit with 100% bypass and integral humidistat.

MRXBOX-ECO3

Wall mounted unit.

MRXBOXAB-ECO3-OH

Opposite handed configuration wall mounted unit with 100% bypass and integral humidistat.

MRXBOX-ECO3-OH

Opposite handed configuration wall mounted unit.

Electrical & Sound ▼

	Maximum power consumption		Sound Power Levels dB re 1pW (Frequency Hz)								dBA @3m
Curve	(Watts)		63	125	250	500	1k	2k	4k	8k	
1	156	Open inlet	48	57	60	53	49	44	33	24	
		Open outlet	57	67	63	64	61	61	52	45	
		Breakout	65	59	58	57	50	46	36	26	40
2	67	Open inlet	43	52	56	48	46	40	30	18	
		Open outlet	54	62	59	62	58	58	48	40	
		Breakout	54	55	52	51	44	42	28	<16	34
3	20	Open inlet	38	44	47	39	36	29	16	<16	
		Open outlet	46	53	49	52	46	44	33	21	
		Breakout	47	46	44	42	34	29	16	<16	25
4	7	Open inlet	33	27	26	16	<16	<16	<16	<16	
		Open outlet	39	34	31	32	22	<16	<16	<16	
		Breakout	41	29	27	20	<16	<16	<16	<16	<16

The maximum power consumption shown above (Watts) is consumed on units running continuously, not taking into account any heat recovery saving and based on SAP Product Characteristic Database (PCDB) testing. The breakout case-radiated dBA values are given for Hemispherical free field radiation at 3m - to obtain the Spherical radiated data, subtract 3 dBA.

Please note: Sound data is provided at a particular duty point for 25%, 50%, 75% and 100%. For accurate sound data at a specific speed duty, please use Nuair's fan selector or call the office on 029 2085 8500.



MRXBOXAB-ECO3
& MRXBOX-ECO3

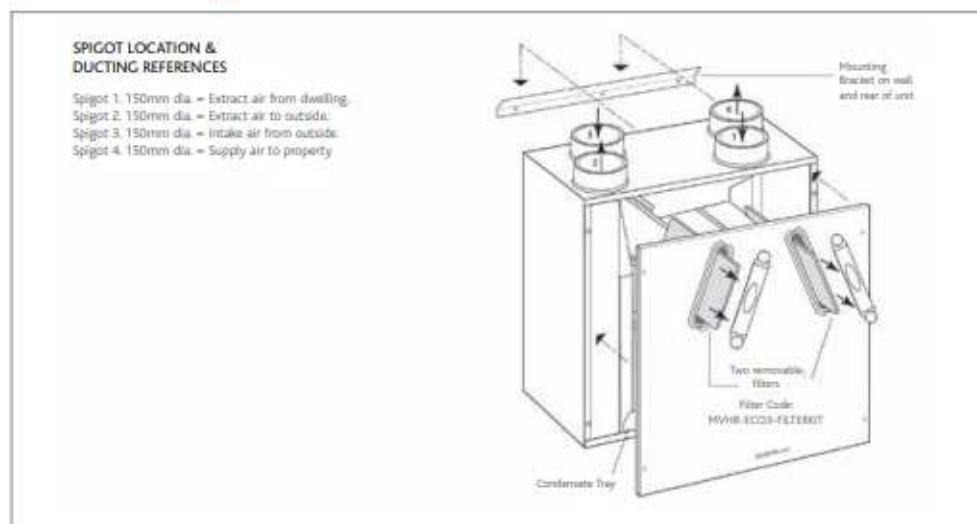
SAP 2009 Test Results ▼

Product Code	MRXBOXAB-ECO3			MRXBOX-ECO3		
Application	Specific Fan Power (W/l/s)	Heat Exchange Efficiency	Energy Saving Trust Best Practice Compliant	Specific Fan Power (W/l/s)	Heat Exchange Efficiency	Energy Saving Trust Best Practice Compliant
Kitchen + 1 Wet Room	0.51	90%	Yes	0.50	91%	Yes
Kitchen + 2 Wet Room	0.46	90%	Yes	0.44	91%	Yes
Kitchen + 3 Wet Room	0.48	90%	Yes	0.46	91%	Yes
Kitchen + 4 Wet Room	0.55	89%	Yes	0.52	90%	Yes
Kitchen + 5 Wet Room	0.62	89%	Yes	0.60	90%	Yes
Kitchen + 6 Wet Room	0.73	88%	Yes	0.70	89%	Yes
Kitchen + 7 Wet Room	0.87	88%	Yes	0.82	89%	Yes

SAP 2012 Test Results ▼

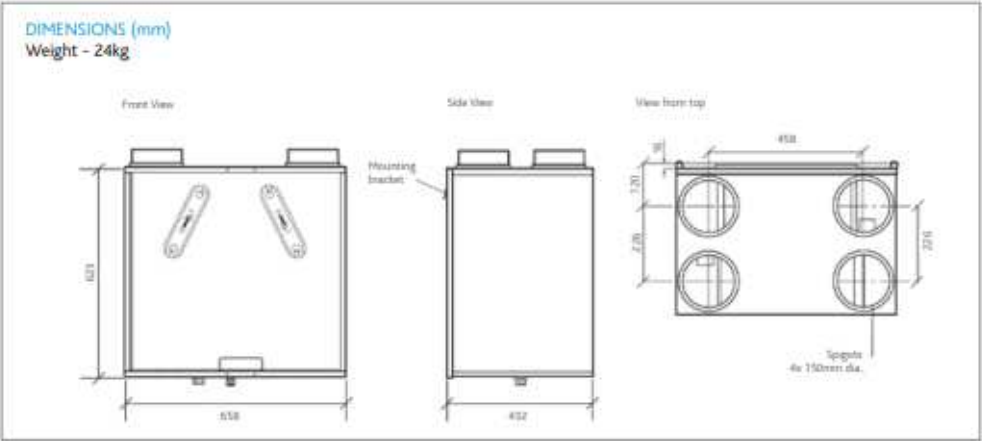
Product Code	MRXBOXAB-ECO3			MRXBOX-ECO3		
Application	Specific Fan Power (W/l/s)	Heat Exchange Efficiency	Energy Saving Trust Best Practice Compliant	Specific Fan Power (W/l/s)	Heat Exchange Efficiency	Energy Saving Trust Best Practice Compliant
Kitchen + 1 Wet Room	0.50	90%	Yes	0.47	91%	Yes
Kitchen + 2 Wet Room	0.53	90%	Yes	0.50	91%	Yes
Kitchen + 3 Wet Room	0.60	89%	Yes	0.58	90%	Yes
Kitchen + 4 Wet Room	0.75	88%	Yes	0.71	89%	Yes
Kitchen + 5 Wet Room	0.92	88%	Yes	0.86	89%	Yes
Kitchen + 6 Wet Room	1.10	87%	Yes	1.08	88%	Yes
Kitchen + 7 Wet Room	1.36	87%	Yes	1.33	88%	Yes

General Arrangement ▼





Technical - MRXBOX(AB)-ECO2 ▼



Electrical Details ▼

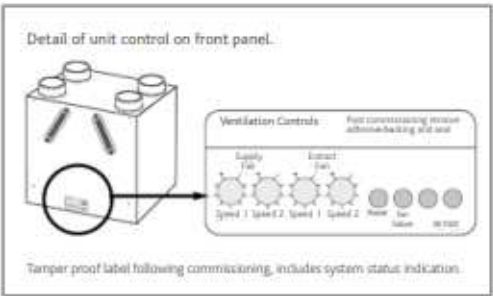
Please note: The electrical connection of the unit must be carried out by a qualified electrician.

The unit is supplied with a flexible cord for connection to the mains supply.

NOTE: This unit must be earthed.

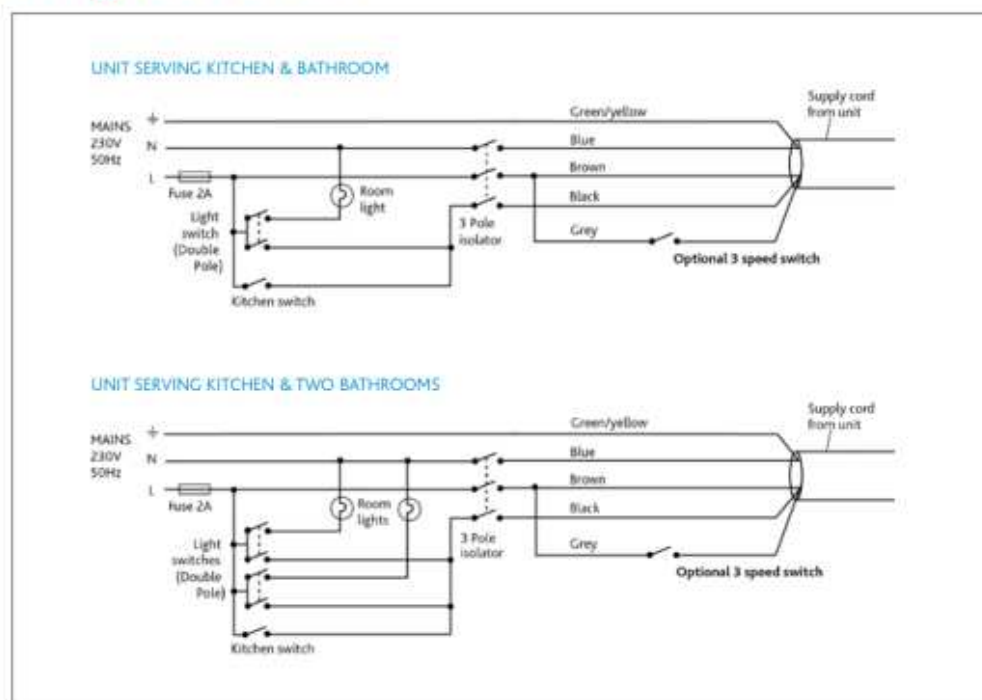
The mains power supply cable should be connected to a fixed wiring installation in accordance with current IEE wiring regulations.

Electrical Details: MRXBOX(AB)-ECO3	
Voltage:	230V 1ph 50Hz
Consumption:	1.2 Amp



MRXBOXAB-ECO3
& MRXBOX-ECO3

Wiring - MRXBOX(AB)-ECO3 ▼



Optional Sensors and Detectors ▼

Customise MRXBOX(AB)-ECO3 for enhanced performance. All supplied with pre-plugged 10m data cable and incorporates status LED.

MRXBOX95-PIR (Passive Infrared)

A low voltage sensor, detects movement and activates system. Incorporates overrun timer and timer adjustments.

MRXBOX95-HUM (Relative Humidity)

A low voltage sensor, activates the system when the RH level is above set point. Incorporates overrun timer and RH setpoint level adjustment.

MRXBOX95-RFI (Remote Fail Indicator)

If fan failure occurs, the audio visual indicator will flash a warning.



MRXBOX-VSC
CONTROL SCREEN
COMPATIBLE WITH
THIS UNIT



Consultants Specification

SPECIFICATION

The unit shall be fully insulated providing excellent thermal and acoustic characteristics and shall be complete with a multi-plate, counter-flow, high-efficiency heat exchanger block, with a thermal efficiency of up to 95%. The heat exchanger shall be protected by G3 grade filters on fresh air inlet and system extract. The heat exchanger and filters shall be accessible via the front access panel, enabling quick and easy maintenance.

The unit shall have low energy, high-efficiency EC fan/motor assemblies with sealed for life bearings, the impellers shall be backward curved centrifugal type. The motors shall be suitable for an ambient temperature of 40°C.

The unit shall be supplied complete with an insulated condensate drip tray and 21.5mm drain connection.

The unit shall be suitable for 150mm circular ducting.

Note: The unit is also available in opposite handed format, refer to spigot configuration for set up.

The breakout noise level and power requirements shall be as detailed by the unit manufacturer and in accordance with the ventilation equipment schedule.

Units shall be MRXBOX-ECO3 or MRXBOXAB-ECO3 as manufactured by Nuaire and shall be listed on the SAP PCDB.

MRXBOX-ECO3-OH and MRXBOXAB-ECO3-OH are opposite handed assemblies compliant as per standard handed versions listed in SAP PCDB.

OPERATION

The supply and extract system shall be positioned as indicated on the drawings and shall be in accordance with the particular fan schedule in the specification.

The combined supply and extract with heat recovery unit shall supply filtered fresh air to each of the habitable rooms and moisture-laden air shall be extracted from all wet areas, e.g. bathroom, en suite, w.c., kitchen, utility rooms etc. The supply air shall be pre-heated by the warm extract air via the integrated counter-flow heat exchanger element. The extracted air shall also be filtered before it reaches the heat exchanger block.

The ventilation unit shall vary its speed and therefore the ventilation rate, as it receives signals from one of the following:

- Switched live signal from light/remote switches.
- When signals are received, the fan shall alter its speed to adjustable, normal and boost rates.

The unit shall have the facility to commission the supply and extract fans independently on minimum speed (continuous background ventilation) and boost speed via inbuilt minimum and maximum speed adjustment. The fans shall have infinitely variable speed control.

INTEGRAL AUTOMATIC HX BYPASS WITH NO REDUCTION IN AIRFLOW (MRXBOXAB-ECO3 & MRXBOXAB-ECO3-OH)

The bypass damper shall open automatically via a wax actuator, allowing the air to bypass the heat exchanger to deliver fresh filtered air during the warmer months.

The automatic bypass diverts 100% airflow around the heat exchanger with no reduction in airflow as independently tested by the BRE.

INTEGRAL HUMIDITY SENSOR (MRXBOXAB-ECO3 & MRXBOXAB-ECO3-OH only)

The integral humidity sensor incorporated within the extract fan chamber will automatically boost both the extract and supply fan, to the commissioned boost speed, when the humidity level exceeds that set by the front panel mounted adjustment potentiometer.

CONTROL OPTIONS

All versions shall have the following functions integrally mounted within the fan unit on a purpose made PCB, all such components are pre-wired and factory fitted by the manufacturer:

- Independent control of background supply and extract flow rates.
- Independent control of boost speed supply and extract flow rates.
- Integral heat exchanger frost protection.
- Fan failure indication.
- Integral S/L terminal for boost from remote switch, e.g. light switch.
- Additional S/L terminal for 100% boost speed from remote switch, e.g. plate switch.
- Discreet daily run monitor.
- Indication and controls – the unit shall have clear LED visual indication for maintenance, servicing and operation mode, i.e. HX bypass, frost protection.

MRXBOX-VSC (VISUAL SYSTEM CONTROLLER)

The MRXBOX-VSC is compatible with the Nuaire MRXBOX(AB)-ECO3 heat recovery units and can be purchased separately. The controller comes complete with commissioning and end user functions.

The display will be a 3.5" LCD display and will remain on standby until such time the screen is touched.

The initial display will show the MVHR system status as listed below:

- Current fan speed.
- Current indoor/outside temperature.
- Indicate when the Summer bypass is activated.
- Indicate when frost protection is activated.
- Indicate when the filters require cleaning/changing.

The unit shall come with a 5 year warranty which starts from the day of delivery, and includes parts and labour for the first year and parts only for the remaining 4 years.



Edel RF Hot Water Heat Pump



Product Description

Edel heat pump cylinders comprise of a stainless steel inner vessel with a hot water heat pump mounted on top. The heat pump produces hot water very efficiently by extracting heat from external air supplied via insulated ductwork, which is available as an accessory. This highly efficient cylinder reduces the dwelling emissions in SAP making it possible to pass using electric space heating and an Edel heat pump cylinder. Edel cylinders feature RF connectivity and can be controlled remotely when connected to a DimplexHub.

Key Features

- Internet-connected smartphone app connectivity
- The Edel heat pump consumes 5 times less electricity than standard electric water heated cylinders
- Helps to pass Part L of building regulations when specifying electric heating
- Compact 630mm diameter units, available in 200L or 270L hot water capacity cylinder options
- Stainless steel tank with 5 year guarantee, no sacrificial anode requirement
- Very quiet in operation due to soundproof hood housing, variable speed fan and the rotary compressor being mounted on anti-vibration pads
- Patented high performance heat exchanger with defrost mode operation in UK climates

Internet Connectivity

App platform	Dimplex Control
Connectivity method	RF 868Mhz (Included)
Additional hardware	Requires 1 x 'DimplexHub'



Use of Dimplex control is subject to agreement of the GDPR Internet of Things (IoT) [Terms and Conditions](#), [Privacy Policy](#) and [Cookie Policy](#).



©DEL (Glen Dimplex Heating & Ventilation)

Technical Details

Heat pump performance		Edel 200 UK RF	Edel 270 UK RF
Model code		EDL200UK-630RF	EDL270UK-630RF
Item Code		101587	101594
Nominal volume	L	200	270
Air operating range	°C	-7 to +35	
Achievable hot water temperature via heat pump	°C	60	
Max. electrical power input (heat pump & immersion)	W	700 + 1200 = 1900	
Max. thermal power output (heat pump ONLY) at 45°C	W	1300	
Max. power output (heat pump & immersion) at 45°C	W	1300 + 1200 = 2500	
Air flow	m ³ /h	320 to 400	
Sound pressure level at 2m	dB(A)	37 (speed1) / 40 (speed2)	
Refrigerant	/kg	R290/ 0.15	
Standing heat loss	kWh/24hr	1.61	1.77
Air ducting method		Separate inlet and outlet to exterior	
Heat up from cold (10°C)		7hr 15mins	9hr 48mins
Coefficient of performance		3.36	3.30
Dimensions & connections			
Dimensions	mm	630 x H 1460	630 x H 1780
Weight with packaging	kg	70	79
Weight without packaging	kg	56.5	63
Air duct diameter	mm	160	
Max. ducting pressure drop		220Pa at min. air flow rate 320m ³ /hr	
Water connections	Inch	M 3/4"	
Condensate tube	mm	18/24	
Electrical supply		230V 50Hz - BA	
IP rating		IPX4	
MCB type C	Amp	16	
Hot water cylinder			
Material		Stainless steel	
Insulation		50mm PU foam with PVC outer	
Refrigeration heat exchanger		Double walled separation from potable water	
Max. operating pressure	bar	6	
Max. condensate production	L/h	0.3	
Integrated electric immersion heater	W	1200	
Max. temperature with immersion heater	°C	65	
Approvals			
Water regulations		G3 KIWA approval to EN12897	
T&P valve		Factory fitted	
Accessories		Inlet group, tundish, expansion vessel	
Guarantee (UK)		5 years tank (2 years other parts)	

Issue 1

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