

Piccadilly Warehouse – Conversion of Office Space to 80 Apartments

Mechanical Ventilation with Heat Recovery (MVHR) – Ventilation Statement for Apartments

Introduction

The purpose of this report is to detail the ventilation strategy for 80 new apartments which are accommodated in two Grade II-listed buildings; Mindel House and Bloom Street. As the building is of a historic nature there is a requirement for the existing character to be retained. However, the building needs to adhere to the Building Regulations. In particular, Part F Vol 1 (Ventilation in Dwellings 2021); Part L Vol 1 (Conservation of Fuel & Power – Dwellings 2021); and Part O (Overheating – Overheating Mitigation 2021) in order to fully comply with the Regulations, it is proposed that individual mechanical ventilation with heat recovery units are installed to all individual apartments.

Given the age of the building, it is expected that the air tightness is relatively poor and by extracting air only, would encourage make up air to be taken from outside that would require additional heating in cold conditions. Conversely, when the outside ambient temperature is adversely warm this could cause overheating.

Furthermore, the walls to the buildings do not have any conventional vapour barriers and consequently, continuous mechanical ventilation will aid in the removal of humidity.

General Strategy

Each apartment will have a mechanical ventilation heat recovery unit (MVHR) located generally within the utility room or within in a dedicated ventilation plant room. These units shall operate continuously, extracting stale or moist air from bathrooms, utility rooms and adjacent to cookers. Concurrently, the MVHR units will draw in fresh supply air from outside and input this into the bedrooms and living rooms.

Heat from the extracted air is recovered via a rotary heat exchanger which is used to raise the temperature of the fresh air drawn in from outside. The supply air is also filtered prior to it being discharged into the habitable spaces.

Design drawings for the scheme have been provided within Appendix E of this document.

Ventilation Rates

The ventilation rates proposed are as follows:

1 Bedroom Apartment - 35 l/s

Extract

- 10 l/s Bathroom
- 10 l/s Utility Room
- 15 l/s Kitchen

Supply

- 10 l/s Bedroom 1
- 25 l/s Living Area

2 Bedroom Apartment - 35 l/s

Extract

- 10 l/s Bathroom
- 10 l/s Utility Room
- 15 l/s Kitchen

Supply

- 10 l/s Bedroom 1
- 10 l/s Bedroom 2
- 15 l/s Living Area

3 Bedroom Apartment - 45 l/s

Extract

- 10 l/s Bathroom
- 10 l/s Utility Room
- 25 l/s Kitchen

Supply

- 10 l/s Bedroom 1
- 10 l/s Bedroom 2
- 10 l/s Bedroom 3
- 15 l/s Living Area

Lightwell Apartments (Bloom St Apartments adjoining the lightwell)

(Apartments LG01, UG01, 101, 201, 301 & 401 – Refer to Architectural planning drawings for apartment numbering scheme).

6 no. of the apartments in Bloom St, share the external wall with a ground level car park, within these apartments there are no windows and are therefore provided with a lightwell shaft down to basement level providing natural daylight. Due to there being no windows, we propose to use enhanced ventilation rates to ensure optimal indoor air quality.

The ventilation rates chosen also satisfy the Approved Document F purge ventilation rate requirement.

Extract

- 40 l/s Bathroom
- 40 l/s Utility Room
- 70 l/s Kitchen

Supply

- 40 l/s Bedroom 1
- 110 l/s Living Area

This is in accordance with and exceeds the minimum ventilation rates stipulated within Approved Document F (Vol 1) of the Building Regulations, table 1.2 & 1.3 (see below).

Table 1.2 Minimum extract ventilation rates for continuous extract systems ⁽¹⁾		
Room	High rate (l/s)	Continuous rate
Kitchen	13	The sum of all extract ventilation in the dwelling on its continuous rate should be at least the whole dwelling ventilation rate given in Table 1.3
Utility room	8	
Bathroom	8	
Sanitary accommodation	6	
NOTE:		
1. If the continuous rate of ventilation provided in a room is equal to or higher than the minimum high rate specified in the table, no extra ventilation is needed.		

Table 1.3 Minimum whole dwelling ventilation rates determined by the number of bedrooms	
Number of bedrooms ⁽¹⁾⁽²⁾	Minimum ventilation rate by number of bedrooms (l/s)
1	19
2	25
3	31
4	37
5	43
NOTES:	
1. If the dwelling only has one habitable room, a minimum ventilation rate of 13l/s should be used.	
2. For each additional bedroom, add 6l/s to the values in Table 1.3.	

MVHR Units

The manufacturer of the MVHR units will be Komfovent, the selected units are from their residential range; Domekt. Each unit is complete with a rotary heat exchanger, EC fan/motor assemblies, F7 supply filters, M5 exhaust filters and fresh air electric heater battery. Each selected unit achieves an efficiency greater than 80%. (See appendix A for technical selections). In addition,

Ductwork and Terminal Outlets

All ductwork will be spiral wound galvanised steel in accordance with BESA DW/144. Ductwork will be exposed and run at high level within each apartment emanating from the MVHR unit and distributed to extract and supply air valves situated in strategic locations within the various rooms to limit draughts and ensure good air movement. (See appendix B for images of air valves and ductwork).

Attenuators and Acoustic Lagging

In duct attenuators will be provided to meet the performance requirements of the Acoustic Design Report prepared by Sandy Brown Ltd. In addition to the above, acoustic lagging will be installed on the interconnecting ductwork between the facade and the attenuator. (See appendix C for typical images of attenuators and acoustic lagging).

Louvres / Facade Grilles

The facade grilles / louvres will be sympathetic to the historical nature of the building, heritage drilled type cast iron grilles are proposed. The specified product will have a minimum free area percentage of 50% and the design face velocity will be 1.5m/s. (See appendix D for images of the proposed façade grilles). The size of the grilles can be amended with respect to height and width for aesthetic purposes but the indicative sizes will obviate any water ingress, static pressure on the fans and excessive noise while maximising the efficiency of the unit.

Control

Each MVHR unit and apartment will be equipped with a touch screen control panel running as "auto". The MVHR will be commissioned to run at the design duties detailed in the ventilation rates above.

The control panel will be installed within the living space and is complete with an integrated thermometer and hygrometer for local indoor climate monitoring.

Purge Ventilation

Each habitable room is equipped with manually opening sash windows and secondary glazing except 6 no. apartments adjoining the lightwell within Bloom Street, these apartments are provided with a larger MVHR unit capable of fulfilling the 4 air changes per hour requirement for purge ventilation (discussed earlier within the ventilation rates section).

All other habitable rooms will have purge ventilation via the opening windows. A brief calculation is provided below to demonstrate compliance.

The largest habitable room is 28m², which would require a minimum window opening area of 1.4m². The typical window opening area is 1.58 m².

This exceeds the minimum requirement stipulated in Table 1.4, Approved Document F (Vol 1) of the Building Regulations and thus means that the windows are suitable for purge ventilation.

Table 1.4 Purge ventilation openings	
Opening type	Minimum total area of openings
Hinged or pivot windows with an opening angle of 15 to 30 degrees	1/10 of the floor area of the room
Hinged or pivot windows with an opening angle of greater than or equal to 30 degrees	1/20 of the floor area of the room
Opening sash windows	
External doors	

Appendix A – MVHR Technical Selections

See separate PDF documents referenced as follows:

KOMFOVENT – HR-01

KOMFOVENT – HR-02

KOMFOVENT – HR-03

KOMFOVENT – HR-04

KOMFOVENT – HR-05

Appendix B – Image of Exposed Ductwork and Air Valve



Appendix C – Acoustic Lagging (left) and Duct Mounted Attenuator (right)



Appendix D – Proposed Façade Grilles / Louvres



Appendix E – Ventilation Design Drawings

See separate PDF documents referenced as follows:

Bloom Street

24006-HAK-BS-B1-DR-M-570-01-VENTILATION LAYOUT LEVEL B1
24006-HAK-BS-00-DR-M-570-01-VENTILATION LAYOUT LEVEL 00
24006-HAK-BS-01-DR-M-570-01-VENTILATION LAYOUT LEVEL 01
24006-HAK-BS-01-DR-M-570-02-VENTILATION ISOMETRIC LAYOUTS LEVEL 01
24006-HAK-BS-02-DR-M-570-01-VENTILATION LAYOUT LEVEL 02
24006-HAK-BS-03-DR-M-570-01-VENTILATION LAYOUT LEVEL 03
24006-HAK-BS-04-DR-M-570-01-VENTILATION LAYOUT LEVEL 04
24006-HAK-BS-05-DR-M-570-01-VENTILATION LAYOUT LEVEL 05

Mindel House

24006-HAK-MH-B1-DR-M-570-01-VENTILATION LAYOUT LEVEL B1
24006-HAK-MH-00-DR-M-570-01-VENTILATION LAYOUT LEVEL 0
24006-HAK-MH-01-DR-M-570-01-VENTILATION LAYOUT LEVEL 1
24006-HAK-MH-02-DR-M-570-01-VENTILATION LAYOUT LEVEL 2
24006-HAK-MH-03-DR-M-570-01-VENTILATION LAYOUT LEVEL 3
24006-HAK-MH-04-DR-M-570-01-VENTILATION LAYOUT LEVEL 4

Typical Sections

24006-HAK-ZZ-ZZ-DR-M-570-01-VENTILATION TYPICAL SECTIONS