



WHITECODE
CONSULTING

Post Completion Ventilation Report

The Charter, Gravesend

Prepared for Watkins

Drawing No. 12825-WCL-ZZ-ZZ-IN-Z-0001

02 October 2025

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1. Introduction

Whitecode (WCL) were instructed by Watkins to clear the following planning condition:

Prior to first occupation of the apartments, a suitable post-completion commissioning report by a competent independent ventilation / consulting engineer confirming that the approved system has been incorporated into the residential apartments and that the systems fulfil the purpose (i.e. that it prevents outside air entering the residential apartments) shall be submitted to and approved, in writing, by the Local Planning Authority. For the avoidance of doubt this shall include an inspection by an officer of the Local Authority to see the system is in place and in suitable working order.

This involved a site visit, which took place 30th September 2025.

The follow 2 plots was investigated: plot E010902 and plot E030303.

This report has been prepared by Dean Loizou, a Chartered Engineer / Qualified Building Services engineer with 13 years' experience in ventilation system design and commissioning. The purpose of this report is to demonstrate compliance with the above Condition which requires confirmation that the approved ventilation system has been installed, commissioned, and fulfils its intended purpose of preventing external air ingress into the residential apartments.

2. Inspection

Desktop Investigation

Acoustic Requirements

It was investigated if there was a need to for windows to be shut due to external noise constraints that could affect the ventilation system used.

It was also investigated the noise levels required for the Ventilation system within the apartments to ensure this was complied with.

The Acoustic Report produced by KP Acoustics, *reference 20764.ADR.01_Ver1*, was reviewed and it determined that there was no need for windows to be shut for purge or overheating purposes.

Section 2.0 of the report provided the noise criteria required within the habitable spaces.

2.0 NOISE CRITERIA

Noise Criteria

The acoustic design criteria for external noise intrusion are defined in Table 2.1. These have been derived following the guidance given in BS8233:2014 '*Sound insulation and noise reduction for buildings*'.

Room	Daytime	Night-time
Bedrooms	35	30
Living Rooms	40	-

Table 2.1: Internal Noise Criteria, L_{eq} – External Noise Intrusion

Table 2.2 lists the internal noise criteria to be achieved from building services within all habitable and commercial spaces.

Room	Minimum	Normal
Bedrooms	NR20	NR25
Living Room	NR25	NR30
Bathrooms	NR30	NR35
Kitchens	NR30	NR40
Commercial Spaces	NR38	

Table 2.2: Internal Noise Criteria - Building Services Noise

Air Quality

It was investigated if there was a need to NOX filters or similar due to the proximity of the site to the main one-way system, Crooked Lane.

The Air Quality Report produced by Waterman's, reference WIE14364-103-R-1-2-1_AQA, was reviewed and determined there was no mitigation measures required on the ventilation system.

Operational Development

- 7.4. As identified earlier in this report, even in the absence of mitigation, the Development is predicted to have a **not significant** effect on local air quality. Accordingly, mitigation measures would not be required so **residual effects** would be **not significant**.
- 7.5. However, air quality mitigation measures have been included as part of the Development, which are likely to have a benefit to air quality and to ensure the operational Development does not delay compliance to the EU Limit Values.
- 7.6. **Table 12** presents the air quality mitigation measures included as part of the Development.

Table 12: Summary of Mitigation Measures included in the Development

Phase	Mitigation Measures
Inherent – Measures included in the design of the Development	Provision of secure and sheltered cycle parking spaces
	Provision of trees and plants
	Implementation of green infrastructure at ground and roof levels
Operational Development	Provision and monitoring of Travel Plan and Delivery and Servicing Plan

Overheating Requirements

It was investigated if there was a need to for the ventilation system to ensure compliance with the overheating report.

The Air Quality Report produced by Stroma Built Environment, reference 83112 TCR The Charter D-02_Ver1, was reviewed and determined there was no requirement of the mechanical ventilation system to assist in achieving CIBSE TM59 Overheating requirements.

The results show that the risk of overheating under the proposed design is well within the recommended guidance levels for criterion 1. In criterion 2, further investigation is required for the dimension of the operable windows on the ground floor and top floors. TM59 requires only DSY1 to pass and DSY2 and DSY3 are for information only.

Blinds have been included and windows can only be operated when the blinds are not in use.

This is due to several factors and good practice design measures implemented by the applicant:

- External shading measures have been introduced to limit solar gain in high summer. These include overhanging balconies. In addition, a mild solar control glass has been specified in order to reduce risk further.
- Floor slabs shall be designed as accessible where possible, in order to utilise the available thermal mass of the building.
- Large opening windows/doors shall allow for rapid purging of heat during hot weather.

As the design has shown to limit overheating risk to within levels recommended by CIBSE TM59, no recommendations are listed.

Installation Verification

The installed system has been inspected on-site and compared against the approved design drawings and specifications, as the table below.

Document/Drawing Number	Document/Drawing Title
CC1087-WTK-E1-ZZ-DR-X-00356	BLOCK E01 MECHANICAL SERVICES APARTMENT LAYOUT APARTMENT TYPE 065 1 Bed 1 Person
CC1087-WTK-E3-ZZ-DR-X-00305	BLOCK E03 MECHANICAL SERVICES APARTMENT LAYOUT APARTMENT TYPE 002 1 Bed 2 Person
L20006-EDC-XX-XX-SH-M-001	Mechanical Equipment Schedule
L20006-EDC-XX-XX-SP-M-0001	Mechanical Particular Specification
TS 003 - Nuaire MVHR Units	Technical Submittal MVHR Unit

All information can be found in Appendix A.

Following the site visit, all specified equipment has been installed as designed, that was visible at the time of inspection.

Installation workmanship complies with relevant standards, including Part F and CIBSE Guides. .

Refer to table below showing the installation on site.

Image	Comment
	MVHR has been installed to a high standard, with minimal flexi and waste installed via Hepvo trap. Filters are easily accessible for future maintenance.
	Metal air brick has been installed inline with detailed drawings. Both intake and exhaust grilles have been provided on external façade to each apartment.

	Boost switch has been provided to bathrooms and kitchens inline with Part F requirements.
	Air Supply/Extract grilles have been installed in all required spaces within the apartment as per the drawings and Part F requirements.



Filters have been installed and in accessible location to filter air from external and mitigate pollutants within the apartment

Commissioning Results

2No. Plots was witnessed to ensure the Part F flow rates for both trickle and boost mode was achieved. Airflow rates were measured and balanced within tolerance levels defined in the design specification.

Appendix B shows the data sheets. Plot E010902 and Plot E030303.

The boost function was tested and confirmed operational.

All filters and sealing points inspected and confirmed as correctly installed and performing as intended.

The table below shows the Design valves shown on the Watkins Apartment Types (PLOT E030303) and the Design/Measured values, to illustrate the Part F requirements was being achieved.

Test	Location	Design Value	Measured Value	Image	Pass/Fail
Boost Mode	Kitchen	13 l/s	13.39 l/s		✓
Boost Mode	Cupboard	8 l/s	9.14 l/s		✓

Boost Mode	Bathroom	8 l/s	9.47 l/s		
Boost Mode	Living Room	15 l/s	15.25 l/s		

Boost Mode	Bedroom	15 l/s	15.06 l/s		
Trickle Mode	Kitchen	5.8 l/s	6.67 l/s		

Trickle Mode	Cupboard	3.5 l/s	4.333 l/s		
Trickle Mode	Bathroom	3.8 l/s	4.19 l/s		

Trickle Mode	Living Room	6.2 l/s	6.81 l/s		
Trickle Mode	Bedroom	6.2 l/s	6.67 l/s		

All figures achieved design or was within the relevant tolerances.

3. Summary of Findings

Based on the post-installation inspection and commissioning tests, I confirm that:

- The ventilation system installed in the residential apartments has been completed in accordance with the approved plans and specifications.
- The system fulfils its intended purpose of preventing the ingress of external air into the apartments inline with the air quality report and Part F requirements.
- The system is fully operational and ready for use.



Appendix A – Design Information

Rev.	Status	Date	Originator	Checker	Approved By
T01	ISSUE FOR TENDER	25.02.2021	AM	ED	ED

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1 GENERAL

This part of the Specification is for a new the proposed development, hereby referred to as The Charter, is in Gravesend by Crooked Lane and Bank Street located at Market Square and Horn Yard car parks, New Swan Yard, Gravesend, DA12 2EN. The 0.8 hectares site has been acquired by Reef Group for the development of a 244-unit residential development from a space previously utilised for vehicle parking for the local area.

The development itself consists of 3 residential cores, E01, E02, and E03, with a multi-storey carpark within E02 and E03 known as E04. E01 is 10 storeys high with the services and tank room located within the ground floor. E02 is 6 storeys high with a basement level containing the services and tank room which services both E02 and E03. E03 is 5 storeys high with 2 below ground basement levels. E04, the carpark, contains 5 levels for vehicle parking.

All necessary, additional, and secondary steelwork and other equipment required to provide an adequate and complete support of the services shall be provided for the services which form a part of this section of the works.

Specific plant and equipment details are provided in the Schedules of Technical Requirements included within the equipment schedules or indicated on the drawings.

This Section of the Works includes the responsibility for ensuring the manufacturer of a particular product is furnished with both the general, and specific, technical requirements information for that piece of plant and equipment.

Please note for the avoidance of doubt, if there is any contradiction of conflict between these sections and any other general ones, then this hierarchy should apply. However, any such instance should be pointed out to the Engineer in writing and clarification sought.

The contractor shall include for the installation and coordination of the site services element of the works in accordance with this specification and associated drawings. The design, installation and interaction with local authorities are all deemed to be part of the Contract Works.

2 INTRODUCTION

The Charter located at Market Square and Horn Yard car parks, New Swan Yard, Gravesend, DA12 2EN. The site has been acquired by Reef Group to redevelop from an existing open vehicle parking lot into a 244-unit residential development. The following pages detail the mechanical specifics of systems contained within the development.

3 MECHANICAL SITE SERVICES

3.1 MAINS/ BOOSTED COLD WATER SERVICES

Incoming mains water services and uses around the site shall connect to the site ring main according to the relevant drawing.

It has been confirmed with Southern Water and approved that a new water main will be provided to this development.

The following locations currently are being installed with mains water connection:

- 1 No. metered bulk supply directly into the tank room of E01 from Bank Street which services block E01
- 1 No. metered bulk supply directly into the tank room of E02 from Bank Street which services both blocks E02 and E03

The mains water system shall be installed to provide a feed to the combined cold water and sprinkler tanks & Cat 5 tanks at tank rooms of E01 and E02. Back flow protection valve, double check valve, or RPZ back flow valve shall be provided for water protection to landlord Cat 5 system, this will be subject to confirmation by utility provider.

A bulk meter shall be installed for usage purposes for both mains water supply and shall be accessible through manholes in accordance with the supplier standards.

The water main shall run below ground and enter the water tank rooms with necessary valves as shown in their respective drawings.

A magnetic type water conditioner shall be provided for the incoming mains before it feeds the tanks or after the booster set, please refer to EDC drawing. Water leak detection system shall be provided for incoming mains. For more details please refer to the cold water schematic and drawings.

Automated leak detection and alarm systems are required for below ground pipework, especially where long distances are covered and/or pipework runs beneath buildings, adoptable roads, or private external areas.

Sectional, internally flanged base, twin compartment, GRP tanks will be provided for potable cold-water storage shall be provided. The tanks will have encapsulated thermal insulation and be provided with access manholes, overflow and warning pipes – incorporating insect screens – to comply with British Standards and Water Byelaws.

Twin compartment cold water storage tank will comply with the local water regulations and shall be provided with complete overflows / warning pipes and air vents.

Sprinklers are to be incorporated in all apartments across the three blocks. To ensure that there is always a dedicated supply of water for the sprinkler system the following tank specification have been noted:

- Block E01: Tank has a capacity of 16,010 L with dimensions (m) 4m L, 2.5m W, 2m H. Sprinkler and Booster Set dimensions (m) are 3m L, 1.5m W, 1.5m H. The minimum flow rate to fill that tank should be 9L/s to achieve break tank fill time in 30 minutes.
- Block E02 & E03: Tank has a capacity of 11,629 L with dimensions (m) 2.5m L, 3m W, 2m H. Sprinkler and Booster Set dimensions (m) are 2m L, 1m W, 1.4m H. The minimum flow rate to fill that tank should be 6.5L/s to achieve break tank fill time in 30 minutes.

As noted in the Fire Strategy the sprinkler system will be a category 3 system with a minimum supply duration of 60 minutes, discharge density of 4mm/min (single head) and 2.8mm/min (two heads), single pump, shared water supply and concealed heads. Please refer to the BB7 Fire Strategy for The Charter for further details. Final calculations and sizing of sprinkler system are determined by the sprinkler specialist.

A floor mounted CAT 5 break tank system has been allowed for the bin store area wash down. Also provided connection to cycle store as indicated in the EDC schematic layout. These supplies are pre-softened via an ionisation unit in the tank rooms.

Due to the number of connected apartments on the boosted network and the variance in simultaneous demand across the site it is recommended that all booster pumps on the manifold rig will be variable speed, inverter driven all controlled via the main control panel supplied. The system will operate to achieve constant pressure and variable flow across the boosted network. The main control panel is to come with a link output to the BMS system. The BMS system is not to control the pumps, only to interface and detect any fault outputs.

Pressure reduction will be achieved at each floor via PRV's before the main meter manifold. The client will confirm the chosen specialist for sub-metering of all residential units and in conjunction with the agreed bulk metering by Southern Water to be installed. Surge arresters and back flow protection on

the network shall also be incorporated where required as per the EDC schematics. The water prior to entering the network shall be electro magnetically conditioned.

The contractor is to allow for providing a new incoming water main, break tanks and booster sets as scheduled and as shown on the drawings.

The works shall include the full installation, in accordance with the Local Water Authorities water byelaws and requirements, and provision of:

- Arranging for using a new incoming water supply including the provision of the statutory authority's water meters.
- Provision for connections to a sectional GRP water storage tanks.
- Potable water booster pump sets.
- Pipework distribution systems to apartments.
- Thermal insulation on all cold-water pipework
- All IV's NRV's PRV's, double check valves strainers and ancillaries
- Associated support steelwork
- Surge arresters fitted to the top of boosted risers
- Chemical cleaning of all pipework, components, and plant and for providing a chlorine injection tee on the incoming mains water supply
- Testing and commissioning
- Earthing and bonding to ensure electrical continuity of all systems in accordance with the IEE regulations

The control of Legionella in water systems shall be carried out in accordance with CIBSE TM13:2013 and (UK) HSG:274. It is necessary for the building services management regime to form an integral part of the preventative measures for Legionella control. Refer to water treatment measures for further information.

All pipework carrying unwholesome water shall be readily distinguishable in accordance with BS1710 and separate from wholesome supply in accordance with WRAS water regulations code. Double-check valves shall be provided on permanently connected fixtures such as washing appliances, to prevent back siphonage in absence of an air gap to that appliance.

Electrically operated solenoid valves shall be provided on the mains cold water supply to the cold-water storage tank. These shall shut the supply to the tank upon receipt of a signal from the high-water level sensors that shall be located within the tank. The solenoid valves shall activate an alarm when in the closed position and shall have the function to be remotely monitored. The solenoid valves shall also be provided with a facility for enabling manual reset. The solenoid valves shall be normally open powered close to prevent unwanted tempering of the incoming water. All solenoid valves shall be linked to the BMS for monitoring.

Any exposed water services pipework to potential external winter conditions shall be frost protected through trace heating and enhanced insulation.

Booster pumps shall be fitted with an automatic alarm that registers as a flashing light on a display panel, provided in a visible location in a common area, whenever the pump fails. In addition, all such pumps shall be fitted with telemetry that provides an autodial facility to an agreed telephone number and sends a pre-recorded message confirming details of the location of the pump that has failed. The autodialled facility shall have a battery back-up.

Cleaner's Store: Unvented electric water heater, 10L capacity shall be proposed for hot water generation to each cleaner's store.

3.2 HEATING SOURCE

The instantaneous electric hot water heaters inside each dwelling shall heat incoming boosted cold water via cylinder and electric immersions using the incoming electric supply from the consumer unit within the dwellings.

The control of Legionella in water systems shall be carried out in accordance with CIBSE TM13:2013 and (UK) HSG:274. It is necessary for the building services management regime to form an integral part of the preventative measures for Legionella control. Refer to water treatment measures for further information.

The Charter does not use any gas fuelled systems for space heating, hot water generation, or kitchen requirements. No gas boilers or gas cookers will be used.

3.2.1 WATER QUALITY & FILTRATION

The system shall include connection points, shut off valves and valved bypasses to allow the flushing operation to be carried out in stages or as may be required in the programme of work.

Orifice plates shall also be installed to check flushing velocities in the main runs and risers.

On completion a specialist contractor shall be employed to carry out a thorough flush and clean of the system using cleaning chemicals as appropriate.

A certificate of completion in accordance with the BSRIA document 'Pre-Commission Cleaning of Pipework Systems (BG 29)' shall be submitted to the Employer before Practical Completion Certificate will be issued.

All chemical control levels as defined within the BSRIA Guide shall be scheduled on completion based on the particular water treatment chemicals that have been utilised.

In hard water areas (above 60mg/l as CaCO₃), the final filling of the system should be with softened water. Under no circumstances should the boiler be fired until the system contains softened water and the appropriate inhibitors.

The system shall be designed to avoid dead legs that might provide areas of stagnant water where bacterial growth can flourish.

Particular attention must be paid to the detail at the top of risers, at flushing bypasses and at dosing pot connections.

The water treatment specialist shall be responsible for selecting appropriate inhibitors and biocides taking the natural pH and the metals in the system into account.

The contractor shall allow for all system commissioning including draining and re-filling. Contractor shall allow for multi-phase developments chemical and biological system water on a minimum of a monthly basis to ensure that water quality, cleanliness, hardness, pH and inhibitor concentration is correctly maintained.

Once an acceptable maintenance regime is established frequency may, with written Employer approval, may be reduced to quarterly until issue of final completion certificate.

Water treatment plant must be included in the system to enable management of network water quality, for protection of the system plant and pipework, including but not limited to:

- Strainers in critical locations (not located after pump sets)
- Electro-magnetic water softening equipment

3.2.2 METERING AND COMMISSIONING

The domestic cold-water system shall be provided with 2 separate main (for block E01 and E02 & E03) incoming meter supply with internal tenant meters to be provided by the metering specialist, Glide, to serve all the apartments. The cold water supplies to each apartment shall be metered using the Glide system. The Glide apartment meters fed from the booster set shall be located in the service riser on each floor under as indicated on the drawings.

The mechanical contractor shall allow for the install of these devices in each of the cores for both buildings.

The contractor shall install, test and commission the complete system as detailed within this specification, accompanying schedules and drawings.

The contractor shall allow for sufficient binder points across the development to ensure a full and complete install of all mechanical plant and ancillaries. This shall be done in accordance with BSRIA BG 2. All binder points are to be located horizontally to prevent air or dirt pockets forming in them. These points shall also facilitate water samples to be taken from them in accordance with BSRIA BG 29.

Firestopping insulation should be used to ensure continuous insulation between fire compartments.

The building energy metering strategy shall be installed as per the Glide schematics and outline proposal.

EDC Note: Flushing shall not occur through the flow meter. A spool piece shall be used during flushing.

Each individual apartment will be energy metered as per the Glide proposal and the space heating will have the functionality to be controlled remotely as per Glide requirements.

3.3 SPACE HEATING

The primary heating source for the development shall be electric radiators. Radiators shall be provided in accordance with specifications and drawings and shall be installed in accordance with manufacturer's requirements. The Contractor shall ensure full coordination of radiators with mechanical and electrical services, structure, and finishes. All radiators are to have independent temperature control.

Each individual apartment will be energy metered as per the Glide proposal and the space heating will have the functionality to be controlled remotely as per the Glide requirements.

Thermostatic control of hot water temperature enabling a constant, pre-settable hot water supply temperature at all times, regardless of temperature or pressure variations in the incoming boosted cold-water supply. (Note: there should be no requirement for localised thermostatic mixer valves at outlets, unless required by special building types).

Electric chrome towel rails will be provided in each Bathroom for heating. Towel rails will be provided with thermostatic control provided by Electrical Services Contractor.

Radiators shall be provided in accordance with specifications and drawings and shall be installed in accordance with manufacturer's requirements. The Contractor shall ensure full coordination of radiators with mechanical and electrical services, structure and finishes.

The Contractor shall produce a mock-up detail of a typical radiator installation.

The heating installations shall be designed to achieve not less than the internal air temperatures given in the following table when the external temperature is -4 degrees centigrade:

Living room	21°C
Dining room	21°C
Bedroom	18°C
Hall, stairs & Landing	18°C
Bathroom	22°C
WC	18°C
Kitchen	18°C
Combined Kitchen / Living Room	21°C

Welfare facility at the basement and amenity areas shall be provided with electric panel radiator.

3.4 VENTILATION

The following section details the ventilation systems that shall be installed in the development.

3.4.1 Apartments:

Ventilation to each dwelling shall be mechanically ventilated by its own dedicated whole house ventilation unit.

- Supply and extract ventilation to be provided to the minimum air flow rates as stated by Approved Document Part F of the Building Regulations.
- The whole house ventilation unit shall continuously operate at its “trickle ventilation” mode 24/7.
- A mechanical ventilation and heat recovery (MVHR) unit will be mounted at high level within a store or utility room.
- Supply ventilation will be provided to the living/kitchen/dining room and the bedrooms.
- Kitchens, WC / Bathrooms, and utility cupboards shall have extract ventilation only. The extract air will be ducted to outside.
- Ductwork shall terminate with ceiling mounted grilles within the flats, and at external louvres or air bricks when at the external wall.
- A cooker extract recirculation hood above the cooker shall be installed to remove cooking odours, by others.

The installations are to be in accordance with BS 8313:1997, BS 9999:2017 and Manufacturer's instructions and recommendations. The installation is to comply with Domestic Ventilation guide 2010 and must be carried out by an accredited installer.

The system in each dwelling will comprise a continuously running low energy heat recovery fan unit (90% efficient), located at high level, wall mounted within the hall store cupboard, with a system of ductwork run to extracts located in kitchens, bathrooms, shower rooms, utilities and WCs and supply air ductwork run to supply grilles in living rooms and bedrooms.

Provision of ventilation to dwellings should comply with Approved Document F 2010 and air volumes are as follows:

Minimum low rate to be 0.3 L/sec per m² floor area or determined from dwelling size as follows, whichever is the greater:

- 1 bed units 13 l/sec
- 2 bed units 17 l/sec
- 3 bed units 21 l/sec

Minimum high rate to be determined from totalling flow rates from wet rooms:

- Kitchens 13 l/sec

➤ Utilities	8 l/sec
➤ Bathrooms	8 l/sec
➤ Toilets	8 l/sec

The contractor is to verify the pressure loss calculations and confirm the selections based on the finally proposed duct route prior to purchase and installation and must verify these calculations at an early stage of installation by means of physical test, with results provided to the CA and M+E consultant for review.

Units will be wired by the electrical sub-contractor, they will run continuously. Fan speeds will be changed by boost switches for the bathrooms via light switch and separate switch in the kitchens.

Purge ventilation to all habitable rooms shall be achieved via natural ventilation via openable windows as advised by The Architect.

Kitchen Cooker Hoods:

All kitchens will also have mechanical recirculation cooker hoods supplied by others but installed by the mechanical subcontractor and wired by the electrical sub-contractor.

Ductwork and Terminations:

All ductwork from the MVHR fan units, within the flats, shall in general be flat duct. Use flat ducting, complete with 90-deg spigot connector, bends, grills, mounting straps double airbrick adaptor and airbrick colour to be confirmed as manufactured by Nuaire. Connections to fans will be by flexible ductwork with a maximum length of 300mm.

All external airbricks as agreed with the design team shall be double in height. All connections from the internal MVHR unit shall be 220mm x 90mm with the ductwork from the façade fully insulated to prevent condensation risk.

Ductwork to be 204mm x 60mm or 220mm x 90mm plastic flat duct system, as indicated on the drawings shall be complete with all associated fittings, connectors and fixings etc. all joints to be sealed and tested. Undercut internal doors are provided to facilitate air transfer from habitable rooms to air extraction points.

The contractor should note that coordinated drawings are to be made available before installation commences and ducts must be routed to avoid any overlaps with downlight positions etc. the final supply and extract locations are to be routed to the architects reflected ceiling plans.

All supply grilles are to be 125mm diameter. Samples of the grilles are to be provided for approval. Any flexible connections used are to be kept short as possible maximum 300mm and are to be fully taught.

The installation is to comply with Domestic Ventilation compliance guide. All supply ductwork and exhaust ductwork to and from outside within the ceiling voids are to be insulated. Prior to the closing up the ceiling voids, the main contractor is to witness the installation. The contractor is to refer to the architect's termination details and ensure transformation pieces are provided for the flat duct to connect to the terminals.

3.4.2 Bin Store, & Cycle Store Ventilation

Natural ventilation shall be proposed for venting the communal bin store and the cycle stores in each block. Natural ventilation will be achieved through louvres to maintain 8 air changes per hour.

To achieve venting of the cycle store / bins store areas louvres should be provided to ensure the correct air change rate is achieved through the space. Refer to the BB7 Fire Strategy report for The Charter for further details.

Basement lift lobbies should be naturally ventilated through the louvre doors to 1.5 sq.m as per fire Water Tank Room.

The Water Tank Rooms are ventilated via natural ventilation through louvres to maintain 8 air changes per hour. The supply & exhaust air fan shall be provided for mechanical ventilation system as indicated in the Water Tank Room layouts. The supply air to the Water Tank Room will be insulated to prevent any risk of condensation from forming.

3.4.3 Amenity Area Ventilation

A dedicated air processing unit will be installed within the high level of the ground floor within the E01 amenity area to provide fresh air to these spaces.

Active comfort cooling will be provided for the amenity spaces within E01 by fan coil units to provide occupants with suitable environment conditions.

The amenity area located on the ground floor of block E01 require heating and cooling with accessible controls to be located within the same area.

Please refer to ventilation drawings for layout and further details regarding this system. Further details regarding the amenity area ventilation systems to be confirmed by Glide.

3.4.4 Communications Room Ventilation

Communications equipment requires active comfort cooling to prevent damage from overheating and condensation. The equipment itself produces significant heat which must be extracted from the room.

The Communications Rooms located in block E01 and E02 require active cooling to maintain an ambient temperature between 10°C and 30°C at all points within the room.

Please refer to ventilation drawings for layout and further details regarding this system. Further details regarding the Communication Room ventilation systems to be confirmed by Glide.

3.4.5 Comfort Cooling

The communications room will require comfort cooling to maintain good working order. Fan coil units will provide heating and cooling to the communications rooms. Please refer to EDC drawings for details on location and the Equipment Schedule for specifics on the units to be installed. A controller for these units shall be installed in conjunction with the system located within the communications room.

The amenity area for E01 will have comfort cooling through fan coils, please refer to EDC drawings for details on location and the Equipment Schedule for specifics on the units to be installed. A controller for these units shall be installed in conjunction with the system located within the amenity space.

3.4.6 Cleaners Store

The cleaners store shall be ventilated via mechanical ventilation system with minimum of 6 to 10 ACH. For more details please refer to EDC ventilation drawing. Ventilation duct shall be fire rated duct work.

3.4.7 Car Park Ventilation

E04, The Car Park ventilation system shall be provided via natural ventilation and shall comply with building regulation, Part B & F.

A free vent area of 1/40 of that level's floor area to be split up, is required for the Car Park to be naturally ventilated. Induction or impulse fans will be included in the system. The remaining free area can be distributed wherever possible. Pollution control needs are to be considered separately and may be more onerous.

The requirements for Natural Ventilation in Approved Document B (Fire) state that at least permanent openings having an equivalent area equal to 5% of the net floor area at that level. A minimum of 25% of the required area to occur in each of two opposing walls.

The final design shall be responsible by specialist.

3.4.8 Smoke Extract/Smoke Control

Communal area smoke ventilation:

Smoke ventilation for the communal area achieved via natural ventilation, for more details please refer to architect drawing & Fire strategy.

Corridor Environmental Ventilation:

Independent Lift lobby / Corridor a mechanical smoke extract system shall be provided to serve the development.

Common corridors to be provided with L5 detection to operate the smoke control system within the corridors. Detector heads to be placed no more than 7.5m radius apart, and no more than 1m from apartment door closest to stair when CFD modelling is required. Beacons and sounders should be provided in external amenity spaces, linked to the relevant corridors.

Non-residential and ancillary areas require a BS 5839-1 L2 system. 0.8m² mechanical extract shaft with pressure sensor in the corridor.

Where common corridors have extended travel distances it should be ensured that a detector head is provided no more than 1m outside. Pressure sensor required in corridor to control shaft's extract rate. Refer to Fire Strategy for further details.

Upon detection of smoke in the common corridor, the vents on the fire floor, the vent at the top of smoke shaft and the stair are to open simultaneously. The vents from the corridors/lobbies on all other storeys will remain closed.

The smoke shafts are to include duplicate fans (duty and standby) with alternative power supplies. The fans in the extract shafts are to be fire rated in accordance with the recommendations of BS EN 12101-6. The fan should be located as indicated in the communal ventilation layout.

The top of the lobby vent should be located as close to the ceiling of the lobby as possible is practicable and should be at least as high as the top of the door connecting the lobby to the stairwell. The lobby vents, in the closed position should be in accordance with BS EN 12101-8.

The corridor environmental ventilation will be achieved by utilising the specialist smoke ventilation system under normal conditions and any time the internal corridor temperatures exceed 26 Deg C. This will operate as follows:

Environmental ventilation mode:

- Temperature sensor activates the opening of the smoke vent on respective floor when temperature reaches 26 Deg C and provides ventilation to the floor via the corridor mechanical environmental ventilation fan.
- Temperature decreases below 26 Deg C the AOV closes
- Under fire alarm conditions the smoke takes priority via AOV control panel and the environment fan should be off via fire alarm.

Smoke mode:

- Upon detection of smoke in the common corridor, the vents on the fire floor, the vent at the top of smoke shaft and the stair are to open simultaneously.

- The vents from the corridors/lobbies on all other storeys will remain closed.

Entrance lobby ventilation:

A dedicated air processing unit will be installed within the high level of the ground floor within the E01 amenity area to provide fresh air to these spaces. The Lossnay (Mitsubishi) LGH050RVXT-E heat recovery unit will be installed in conjunction with the E01 amenity space ventilation system, please refer to the Equipment Schedule for more details on this unit.

3.4.9 Ventilation Testing

Test indicated or scheduled % of the low pressure ductwork for air leakage. Test at the pressure recommended in DW/144 for the classification of the selected ductwork as procedures set out in DW/143. Carry out the tests as the work proceeds and prior to application of thermal insulation.

If the test fails, pressure test two further sections as indicated. If the further tests fail, apply remedial action to the complete ductwork system.

Provide documented evidence of the calculations used to arrive at the allowable loss for the section to be tested and ensure the client or his agent witness and signs the results of the tests.

3.5 PUBLIC HEALTH SERVICES

Above ground foul water and rainwater drainage installation to conform to BS 8301 standards and latest revision of building regulations Part H.

The public health contractor shall install, test and commission all services as detailed in this specification, the general mechanical specification, schedules, and drawings.

The public health engineering services installation shall be carried out in accordance with all relevant regulations and standard codes of practice. The contractor shall note the requirements of the Standards of Materials and Workmanship within this specification.

This specification shall also be read in conjunction with, and cross-referenced to, the associated mechanical and electrical specification and drawings and equipment schedules.

The Contractor shall be responsible for the design development, supply, delivery to site, off-loading, installation, fixing and making of all connections of all materials necessary and the testing and commissioning of the completed installations for the satisfactory operation of the following Public Health Engineering Services.

Although best endeavours have been made to detail all interfaces, the public health subcontractor shall liaise fully with all other contractors and specialists and ensure all interface requirements are provided whether or not detailed within the specifications or on the drawings.

This section of the specification gives an overview of the scope of works. The remainder of the specification and the contract drawings should be reviewed to ascertain the necessary detail to provide a bona-fide tender return.

3.6 WATER TREATMENT

The following water treatment measures shall form an integral part of the building management regime for the control of Legionella in water systems in accordance with CIBSE TM13: 2000 providing protection against Legionella and Pseudomonas bacteria within domestic water, reclaimed water and LTHW systems respectively. Standard procedure as per HSE Part 2; the control of legionella bacteria in hot & cold water systems, Section 2.6 states, 60 seconds as per below;

“Hot water should be stored at least at 60 °C and distributed so that it reaches a temperature of 50 °C (55 °C in healthcare premises) within one minute at the outlets.”

The following treatment measures shall therefore be maintained in accordance with manufacturers and statutory regulatory requirements, with these requirements being included within the O&M manuals for the building. The unit data sheets and maintenance requirements shall be included within the building O&M manuals.

The contractor shall include for the supply, install, commissioning, demonstration, and handover of the following water treatment measures as per the accompanying schedules.

A scale prevention and corrosion control unit shall be installed in building.

The system shall comprise:

- PTFE Dielectric activator components
- Hydrodynamic chambers to aid premature precipitation
- Zinc anode and precision-machined Nickel-plated brass housing complete with patent dry electrical connection. Generated voltage >1 volt

Corrosion control shall be by means of Zinc Ion deposition in the water stream.

The scale prevention and corrosion control units shall:

- Be fitted with screwed connections up to 2" and flanged connections in sizes exceeding this.
- Be sized on flow rate in litres/second at a mean pipe velocity not exceeding 2 metres/second.
- Have a pressure loss at the recommended operating flow rate of .0.1 bar (mbar).
- Have a warranty of not less than 10 years upon registration.
- Be WRAS approved.

The unit shall be placed directly after the boosted cold-water pumps and before the tee-off to the tank rooms to ensure and the end point appliances in the apartments are fully protected against scale formation.

The mechanical contractor shall adhere to the requirements set out in BSRIA BG 29 for all pre-commissioning and the initial system fill.

To comply with the requirements in BSRIA BG 29 (Pre-Commissioning Cleaning of Pipework Systems) water sampling locations shall be installed throughout the development. The following paragraph states the quantity and locations of these points across the development at

An elector magnetic water conditioner to be provided in the boost cold water supply after the booster set.

The mechanical contractor is to allow for the installation of these sampling points to the locations stated above. The mechanical contractor shall submit the sampling frequency to client in accordance with the construction programme throughout the install.

3.6.1 SPRINKLERS

The apartments will be fully protected by a hydraulically calculated and designed sprinkler system. The hydraulically calculated design will be in accordance with BS 9251. Communal areas such as lobbies, transformer rooms, electric cupboards, main electrical switchgear rooms and lift motor rooms will be provided with smoke/heat detectors as a wet protection system is not required (as per the latest fire strategy).

Sprinklers are to be incorporated in all apartments across the three blocks. To ensure that there is always a dedicated supply of water for the sprinkler system the following tank specification have been noted:

- Block E01: Tank has a capacity of 16,010 L with dimensions (m) 4.6m L, 3.1m W, 3.1m H. Sprinkler and Booster Set dimensions (m) are 3 L, 1.5 W, 1.5 H. The minimum flow rate to fill that tank should be 9L/s to achieve break tank fill time in 30 minutes.
- Block E02 & E03: Tank has a capacity of 11,629 L with dimensions (m) 3.1m L, 2.6m W, 3.1m H. Sprinkler and Booster Set dimensions (m) are 2 L, 1 W, 1.4 H. The minimum flow rate to fill that tank should be 6.5L/s to achieve break tank fill time in 30 minutes.

Final calculations and sizing of sprinkler system is to be completed by the sprinkler specialist.

Sprinkler head locations will be shown on the mechanical typical apartment layouts which have been set out in accordance with Sprinkler Systems guidance. A full system design needs to be undertaken by the sprinkler specialist for installation.

The sprinkler supply on each floor will be from the main domestic rising main and will be equipped with a stop valve, flow switch and test connections. All stop valves will be equipped with tamper switches.

Drain stacks shall be provided at the top floor of each core for sprinkler testing purposes (confirm and coordinate with the sprinkler specialist).

Any apartments direct off the Southern Water Main shall have a sprinkler flow switch located inside the apartment in the service cupboard or point of entry for the mains water supply pipe.

3.7 HOT WATER SYSTEMS

The instantaneous electric hot water heaters inside each dwelling shall heat incoming boosted cold water via cylinder and electric immersion using the incoming electric supply from the consumer unit within the dwellings.

Thermostatic control of hot water temperature enabling a constant, pre-settable hot water supply temperature at all times, regardless of temperature or pressure variations in the incoming boosted cold-water supply. (Note: there should be no requirement for localised thermostatic mixer valves at outlets, unless required by special building types).

All bath / WHB / showers will be TMV3 thermostatically controlled.

Include for all pipework, valves, fittings, brackets, plant/pipework supports, attenuation and connections to make a complete and working installation.

Thermostatic mixing valves shall be provided on all hot water supplies specified below to eliminate the risk of scalding. The mechanical contractor shall supply and fit TMV3 thermostatic blending valves at all:

- Shower Mixer Taps
- Bath Mixer Taps

Please note the bathrooms, ensuites & utility cupboards are prefabricated. The connection details to be reviewed and agreed with client.

In the event that the final pipework installation route varies from the layout drawings, the contractor prior to ordering must confirm the external resistance (kPa) of the associated pump set. In the event that the resistance has not been confirmed, the contractor will be held responsible for any additional costs appertaining to upgrade of motor or total pump replacement.

Refer to control strategy for mode of operation for each system. All plant and equipment are as manufactured as indicated on the equipment schedules and below or equal and approved.

The single pipe hot water service pipework shall be provided with self-regulating heater tapes to maintain the design temperature or the contractor to allow for HWS re circulation or electric trace heating in flats where pipe run exceeds 15m.

2 bath apartments shall be provided with direct hot water storage cylinder with a capacity of 200 litres shall be proposed. Refer to EDC Equipment Schedule for details on the storage cylinders.

Valves shall meet the requirements of BS EN 1111 and 1287. Valves shall be set to suit the safe temperature at each outlet type in accordance with CIBSE TM13.

The control of Legionella in water systems shall be carried out in accordance with CIBSE TM 13:2000 and UK HSE Approved Code of Practice HSG:274. It is necessary for the building services management regime to form an integral part of the preventative measures. Standard procedure as per HSE Part 2; the control of legionella bacteria in hot & cold water systems, Section 2.6 states, 60 seconds as per below;

"Hot water should be stored at least at 60 °C and distributed so that it reaches a temperature of 50 °C (55 °C in healthcare premises) within one minute at the outlets."

The works shall include the provision and full installation in accordance with BS806, BS8558, CIBSE Guide G and the local water authority byelaws, of:

- Pipework distribution from the water heaters to each sanitary fitting.
- Thermal insulation of all hot water pipework.
- All stop valves, pressure reducing valves, double check valve, NRV's, strainers and ancillaries.
- Thermostatic mixing valves on the supplies to residential baths.
- Associated support steelwork
- Testing and commissioning.

Each cleaner's store shall be provided with unvented electric water heater.

Pipework must be installed in such a way that its expansion does not reduce the effectiveness of the insulation.

3.8 SANITARY WARE

The mechanical contractor will be responsible for the installation, fixing in place and connection to all items of sanitary ware.

Include for final positioning of all items of sanitary ware to architects specified setting out dimensions.

3.9 FOUL WATER DRAINAGE

Soil, waste, and rainwater drainage services has been coordinated to connect out of the building at basement level (high level) where possible to reach the civils drainage network. Also, wherever possible the drainage pipe is to be directly connected with public sewer at ground floor level. Please refer to the drainage layout drawings for layout map.

The above ground drainage system is a gravity system. At lowest levels (E01-Ground Floor, E02-Basement, E03-Basement level 2, E04-Ground Floor) drainage is connected to nearest manhole or pumped system (by civils engineer).

The contractor shall include for all necessary attendances and coordination with the below ground drainage engineer.

A fully ventilated soil and waste pipework system shall be provided to collect the discharge from the foul and waste fixtures across the development.

Drainage from shall be achieved by gravity in all cases. All soil and waste systems shall combine below ground and connect to the external buried drainage system.

The entire system has been designed as a one pipe system with stacks ventilating to atmosphere at roof level.

The system has been hydraulically broken at ground & first floors in various locations to comply with Part H and BS 12056 with the introduction of stub stacks.

Connections from sanitary appliances to the new soil and waste stacks shall be via local range pipework.

In all areas the drainage pipework shall be accessible. Access shall be provided at all changes of direction and at every floor level as a minimum.

The works shall include the provision and full installation, in accordance with the local authority and Building Regulation requirement of:

- A fully vented soil and waste system
- The fixing and making connections to all sanitary appliances and underslab drainage systems. (Sanitary fittings are to be provided by others)
- Acoustic insulation to all runs of pipework that passes through ceiling voids and other sensitive areas.
- Associated support steelwork
- Testing and commissioning
- Earthing and bonding to ensure electrical continuity of all systems in accordance with the IEE Regulations

Intumescent fire collars shall be provided at each floor level.

Soil and ventilation pipes, fittings and accessories shall be cast iron or PVCu. Wastes pipes and fittings shall be cast iron or PVCu.

All horizontal soil and waste pipe runs are to be concealed and all vertical runs shall be encased.

Where soil and vent pipes pass through a habitable room, they shall be wrapped in minimum 100mm of mineral wool or other equal sound deadening insulation.

Proprietary access panels shall be provided to soil and waste pipes in convenient locations to enable access to all rodding points. Access to any soil pipe passing through a worktop shall be at worktop level.

All pipe runs shall be rodable through a patent access plug at any change of direction.

Installations within Landlords areas & Car Park shall be carried out in Cast Iron to comply with BS EN 877 or HDPE Terrain.

3.10 SURFACE WATER DRAINAGE

All roofs across the development will include the provision for surface water drainage. These will be provided to collect the runoff from all roofs, sub roof between blocks, and canopies / building overhangs.

Generally, all rainwater stacks will be installed in PVC with solvent-welded joints. The rainwater has been calculated to BS 12056 and the building parameters defined by architect (building lifetime + safety factor). Fire collars will be provided where the pipe work penetrates fire rated walls and slabs to maintain the integrity of each fire cell.

Once this discharge goes through the restrictor the internal rainwater pipes throughout the development will transport the attenuated surface water back to a civils connection at ground level.

The below roof apartment balconies shall not have provision for rainwater collection.

The work shall include for the provision and full installation, in accordance with the Local Authority and Building regulation requirements, of:

- Pipework distribution system throughout the building
- Rainwater outlets
- Testing and operation demonstration
- Associated support steelwork
- Condensation insulation to all horizontal runs of pipework where passing through ceiling voids and other sensitive areas
- Earthing and bonding to ensure electrical continuity of all systems in accordance with the ETCI wiring regulations.

The Contractor shall ensure that the proposed drainage system prevents water ingress to the buildings via the flush thresholds. Where external hard surfacing falls towards the building a slot or Aco type drainage channel connected to the surface water drainage system shall be provided across door openings.

Please note for any prefabricated units the final drainage connection details are to be reviewed and agreed with client.

3.11 DRY RISER

The Contractor shall supply, install test and commission a complete dry riser system in accordance with the drawings and specification and BS9990:2015.

The system shall comprise:

- A recessed stainless-steel breeching inlet case to the ground floor brickwork
- Brass valves and drains
- Galvanised steel dry riser pipework
- Recessed Brass landing valves and air vents

In accordance with the latest fire strategy report each of the cores will require a dry rising main. This main will rise within the corner of each stair core from ground floor to the top floor of the residential element of the building. These landing valves will be installed at each level which will protect the main floor plate at each level. This will include a coverage of 60m by hose (as detailed in the latest fire strategy document).

All breeching inlets shall be dual port and located at ground level on the façade of the building within 90m of a fire hydrant. The distribution strategy for each core is such that the dry riser pipework enters the edge of a riser at high level (just under the first-floor slab) which will then drop down to low level to a drain point.

To enter the stair core half way down the drop we are penetrating through into the stair core to just underneath the first landing where the pipe will offset (completely concealed from view but still accessible) to the corner of the stair core where it will rise through all floors. This ensures that the pipework is concealed where possible and can be fully drained in an accessible location at the lowest point on the system. All builders work required for the dry riser system have been sent to the structural engineer to be incorporated into their design.

The Mechanical Contractor is to supply and install 2 No. Dry Riser each for Block E02 & E03 and 4 No. Dry Riser for Block E01 residential portion of the building. The breeching inlet will be located at the entry

of Block E01, E02 & E03 building as shown on the Architects / EDC communal piping layouts. The dry riser pipework will be distributed through the residential entrance area for the residential block to the corner of stair. The landing valve shall be provided in the corner of the stairs each level. A drain point shall be fitted at the base of the dry riser pipe with an AAV at the top. The dry riser pipe will also come with a landing valve installed on the roof for testing purposes. The system shall be designed by a specialist who will indicate the relevant mounting heights and system installation guidelines to adhere to. All landing valves shall comply with BS 5041 with the system as a whole to BS 9990.

Details of the final route can be seen on the EDC ground floor communal mechanical piping layouts.

Horizontal pipework will be laid to fall so it can be adequately and completely drained following testing.

Inlet breech positions and dry riser outlet positions shall be located in accordance with the drawings and as outlined in the project fire strategy.

Fire main installations are to be installed, in each core riser, to comply with Part B of the Building regulations.

The dry riser inlet to all blocks is required as indicated on drawings.

Each installation will comprise a complete fire main (dry riser) installation with outlets on each floor. They are to be installed and tested to the requirements of BS 5306 - Part 1:2006. Isolation valves are to be located within the dry riser main at every 10m intervals to comply with BS 9990.

Each riser is to be 100mm diameter.

In addition, access valves within the dry riser are to be positioned every 10m to comply with the BS regulations. These should be left locked open when finished.

The fire main is to be fed from a 2-way inlet breaching piece. The breaching piece is to be complete with 100mm BS EN 1092-1:2007+A1:2013 Table 16/11 flange for connection to dry riser pipe, 2 no. 2.5" instantaneous inlets with blank caps and chains and a 1" drain connection. The inlet is to be vertically mounted in a flush dry riser inlet box of approved pattern with stainless steel covers, at the main entrance to each block.

Landing valves are to be installed on all floors including the ground. The outlets are to be 2.5" dry riser gate valves complete with 65mm BS EN 1092-1:2007+A1:2013 Table 16/21 flange for connection to dry riser branch, and 2.5" instantaneous female outlet to BS 336:2010 with cap and chain. The outlet valves are to be installed in flush outlet boxes of approved pattern with stainless steel covers.

The fire mains are to be run using 100mm diameter medium grade carbon steel tube to BS EN 10255:2004. The top of each fire main is to be fitted with a 1" automatic air release valve, include for a drain off for each.

4 BMS

There is no BMS intended for this project. The contractor shall allow for the controls for each booster set as described previously in this specification.

5 INSULATION

Install insulation in accordance with BS 5970 for general insulation installation requirements. Comply with the recommendations of clause 10.1 of BS 5970, for insulation bonding adhesives, lagging adhesives, facing and film attachment adhesives.

Comply in general with BS 5422, BS 5970, BS EN ISO 12241 and either BS EN 14303, BS EN 14304 or BS EN 14314 product standards. Use the description of terms as BS 3533. All insulation products

must have a Declaration of Performance (DoP) certificate and be CE marked in accordance with the Construction Products Regulations (CPR).

Supply insulating materials classified in accordance with BS EN 13501-1 Fire Classification of Construction Materials. Classes acceptable are A1/A1L, A2/A2L or B/BL having smoke emission classification of s1 and production of flaming droplets/particles classification of d0.

Employ materials that comply with BS 476-4, non-combustibility test, or obtain a Class 'O' fire rating to Building Regulations.

Horizontal UPVC rainwater pipework shall be provided with 25mm thermal insulation to prevent noise transmission, with a density of not less than 35 kg/m³.

A two-compartment, internally flanged GRP pre-insulated cold-water storage tank shall be provided at Ground floor level within the Water Tank Rooms. The tanks shall be provided complete with ball valve access hatches & ladders.

Apply flat (embossed) or profiled aluminium cladding directly to insulating material, thickness 0.71mm on ductwork.

All intake & exhaust ducting between external terminations and MVHR unit are to be insulated for prevention of condensation forming.

Use insulation hangers spaced at maximum 300mm centres on the underside of ducts.

Where appropriate rock mineral wool duct insulation with properties of Nominal density - 28 kg/m³ to 45 kg/m³ Thermal conductivity - Typical value of 0.034 W/mK at a mean temperature of 10°C, is to be used.

There shall be acoustic and condensation insulation to all runs of pipework (where required by The Contactor) that passes through ceiling voids and other sensitive areas. This shall be 100mm of mineral wool or other equal sound deadening insulation.

The supply air to the Water Tank Room will be insulated to prevent any risk of condensation from forming.

Seal joints and pin penetrations using 100mm wide class 'O' aluminium foil tape. Where cut outs for test holes, etc occur tape over insulation membrane and return to the duct surface. Where insulation abutts duct support inserts that have integral vapour barriers seal using class 'O' foil tape to continue vapour barrier.

In locations where insulation cannot be installed adequately after pipeline or ductline installation, pre-insulated sections shall be installed. Insulation to such sections shall be equivalent in thermal and physical properties to that specified for the remainder of the system including vapour barriers.

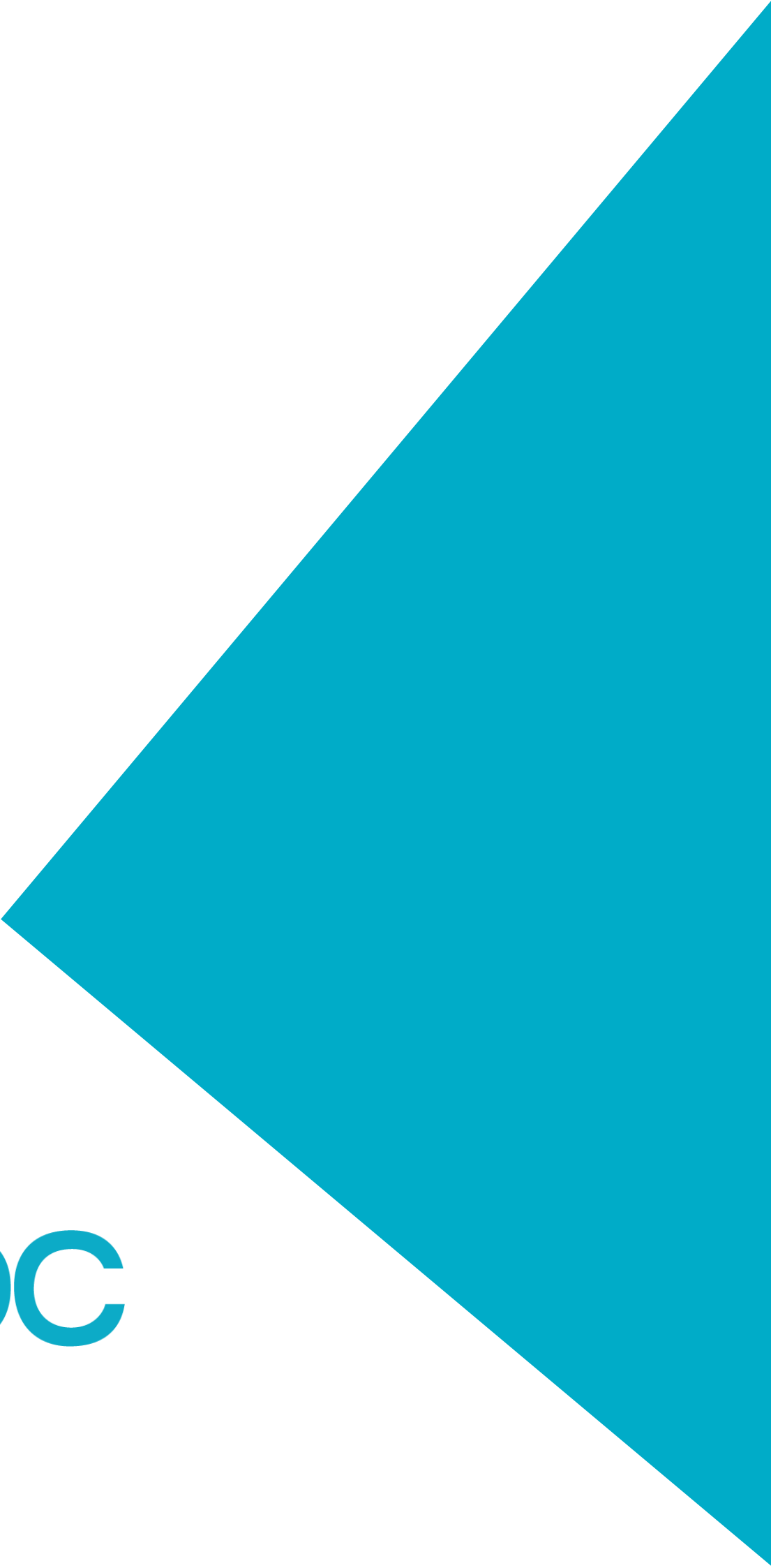
The following are excerpts from the BB7 Fire Strategy for The Charter.

Fire resistance insulation should be in accordance with BS 9999 31.2, which states that when a fire curtain barrier is used to protect a means of escape route, the maximum length of an uninsulated barrier should not exceed 5m. The fire and smoke curtains are not longer than 5m and therefore do not require insulation rating.

All blocks E01, E02, and E03 exceed 18m in height from lowest level to topmost habitable storey, therefore any insulation product, filler material (not including gaskets, sealants and similar) etc, used in the construction of an external wall should be of European Class A2-s1, d0 or better. Note, due to the use of the proposed building, Regulation 7(2) and 7(3) would be applicable and it prevails over the provisions stated within this paragraph.

Note 1: Whilst the guidance above applies to any insulation product, filler material (not including gaskets, sealants and similar) etc. used in the construction of an external wall, consideration should be given to the choice of material used for any other parts of an external wall or attachments to the wall which could impact on the risk of fire spread over the wall.

Note 2: Best practice guidance for green walls (also called living walls) can be found in Fire Performance of Green Roofs and Walls, published by the DCLG.

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EDC

THE CHARTER – HENRY CONSTRUCTION**TECHNICAL SUBMISSION – TS – 003– NUAIRE MVHR**

REFERENCE	THE CHARTER – MVHR	
DESCRIPTION	MECHANICAL VENTILATION HEAT RECOVERY UNIT	
MANUFACTURER	NUAIRE LIMITED	
ADDRESS	4 VICTORIA PLACE	
	HOLBECK	
	LEEDS	
	LS11 5AE	
TEL	02920 858200	
WEB	https://www.nuaire.co.uk	
EMAIL	Enquiries@nuaire.co.uk	
LOCATION	UTILITY CUPBOARD OF EACH 1B & 2B APARTMENTS	UTILITY CUPBOARD OF EACH 2BD, 3B & 3BD APARTMENTS
MODEL	MRXBOXAB-ECO2	MRXBOXAB-ECO3-OH
REQUIRED FLOW RATE	29L/S @ 200Pa	37 L/S @ 250Pa
MAX FLOW RATE	92L/S	106L/S
ELECTRICAL SUPPLY	230/1/50	230/1/50
FUSE RATING	3A	3A
WEIGHT	20KG	24KG
DIMENSIONS	507MM(H) X 607MM(W) X 356MM(D)	623MM(H) X 659MM(W) X 432MM(D)
ATTACHMENTS	MRXBOXAB-ECO2 BROCHURE	MRXBOX-ECO3-OH BROCHURE

NAME	COMPANY	DATE	STATUS
	EDC		
	HENRY CONSTRUCTION		
STATUS A = PROCEED NO COMMENTS, B = PROCEED WITH COMMENTS, C = RE-SUBMIT			
COMMENTS			
Status A - No comments at this stage.			

MRXBOXAB-ECO2 MRXBOX-ECO2 and Opposite Handed versions

ACHIEVES
100%
DUTY IN BYPASS
MODE

The MRXBOXAB-ECO2 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-ECO2 and the MRXBOX-ECO2 are designed to provide optimised balanced (supply and extract) mechanical ventilation with heat recovery and both are 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-ECO2 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.

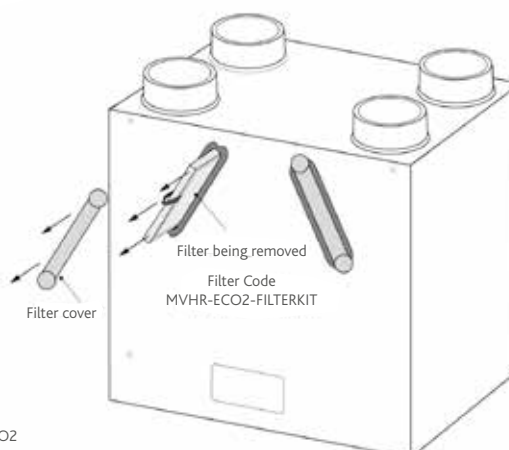


Typical Installation ▼

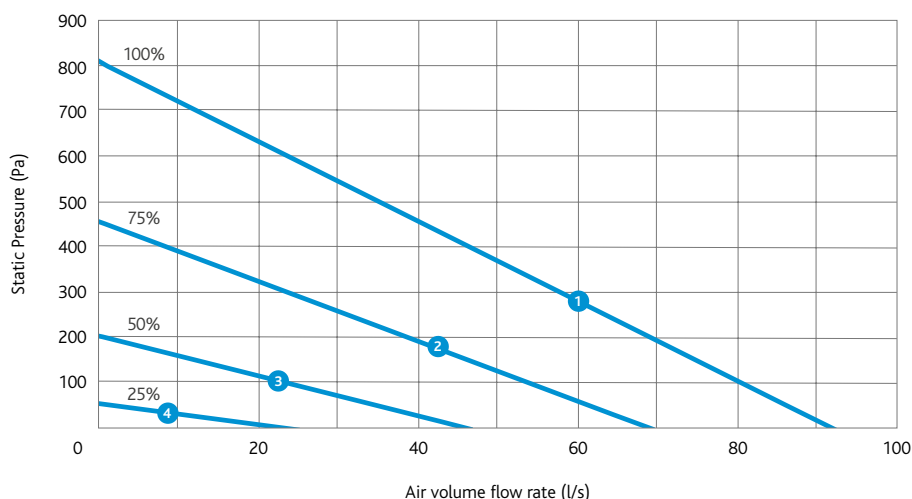
INSTALLATION FEATURES



Typical cupboard installation of MRXBOXAB-ECO2



Performance - MRXBOX(AB)-ECO2 ▼



CODE DESCRIPTION

MRXBOXAB-ECO2

Wall mounted unit with 100% bypass and integral humidistat.

MRXBOX-ECO2

Wall mounted unit.

MRXBOXAB-ECO2-OH

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

MRXBOX-ECO2-OH

Opposite handed configuration wall mounted unit.

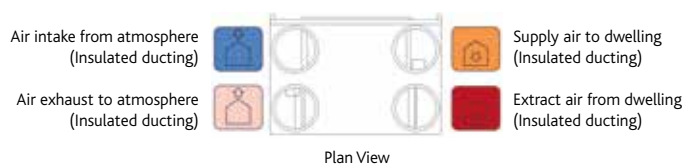
Electrical & Sound ▼

Curve	Maximum power consumption (Watts)		Sound Power Levels dB re 1pW (Frequency Hz)								dBA @3m
			63	125	250	500	1k	2k	4k	8k	
1	155	Open inlet	48	52	59	55	50	46	35	27	
		Open outlet	60	67	69	69	64	64	54	46	
		Breakout	59	60	58	59	49	46	35	27	40
2	69	Open inlet	44	47	57	50	45	41	30	21	
		Open outlet	55	63	63	65	60	59	49	40	
		Breakout	56	57	53	52	44	40	28	18	34
3	19	Open inlet	39	38	48	40	35	29	16	<16	
		Open outlet	48	54	53	55	49	47	35	24	
		Breakout	43	48	44	42	34	29	<16	<16	24
4	7	Open inlet	38	31	27	23	<16	<16	<16	<16	
		Open outlet	38	34	31	31	22	<16	<16	<16	
		Breakout	37	31	24	20	<16	<16	<16	<16	<16

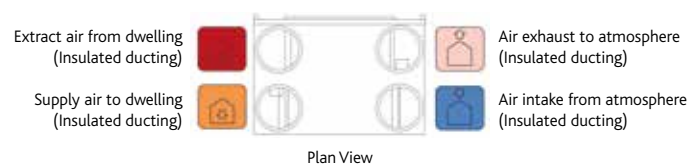
The maximum power consumption shown above (Watts) is consumed on units running continuously, not taking into account any heat recovery saving and based on SAP Product Characteristic Database (PCDB) testing. The breakout case-radiated dBA values are given for Hemispherical free field radiation at 3m - 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 Nuaire's fan selector or call the office on 029 2085 8500.

Standard Handing



Opposite Handing



MRXBOXAB-ECO2
& MRXBOX-ECO2

SAP 2009 Test Results ▼

Product Code	MRXBOXAB-ECO2			MRXBOX-ECO2		
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	0.49	90%	Yes	0.46	90%	Yes
Kitchen + 2 Wet Room	0.50	90%	Yes	0.45	89%	Yes
Kitchen + 3 Wet Room	0.58	89%	Yes	0.50	89%	Yes
Kitchen + 4 Wet Room	0.69	88%	Yes	0.60	88%	Yes
Kitchen + 5 Wet Room	0.81	87%	Yes	0.70	87%	Yes

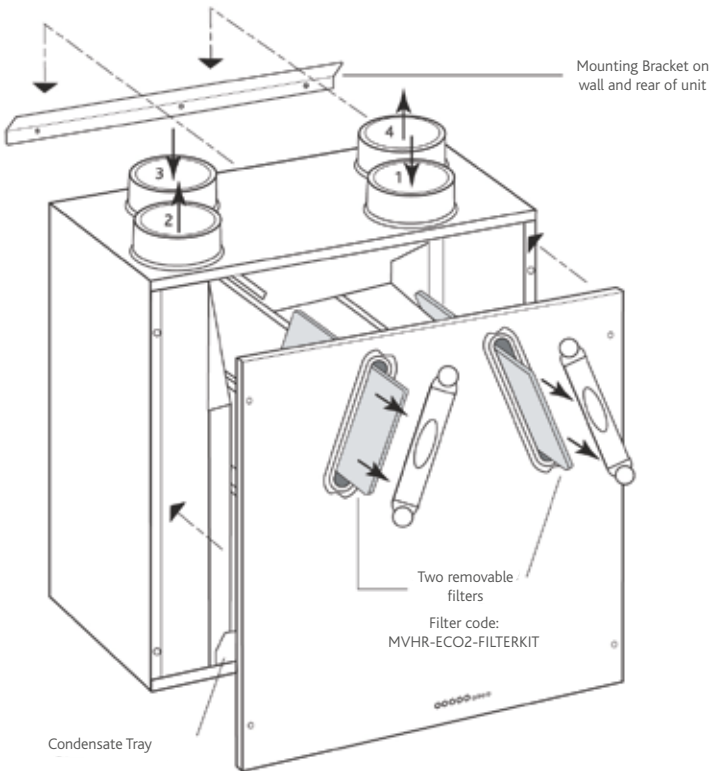
SAP 2012 Test Results ▼

Product Code	MRXBOXAB-ECO2			MRXBOX-ECO2		
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	0.52	90%	Yes	0.47	89%	Yes
Kitchen + 2 Wet Room	0.59	89%	Yes	0.54	88%	Yes
Kitchen + 3 Wet Room	0.77	87%	Yes	0.66	87%	Yes
Kitchen + 4 Wet Room	1.00	86%	Yes	0.85	87%	Yes
Kitchen + 5 Wet Room	1.23	86%	Yes	1.05	86%	Yes

General Arrangement ▼

SPIGOT LOCATION & DUCTING REFERENCES

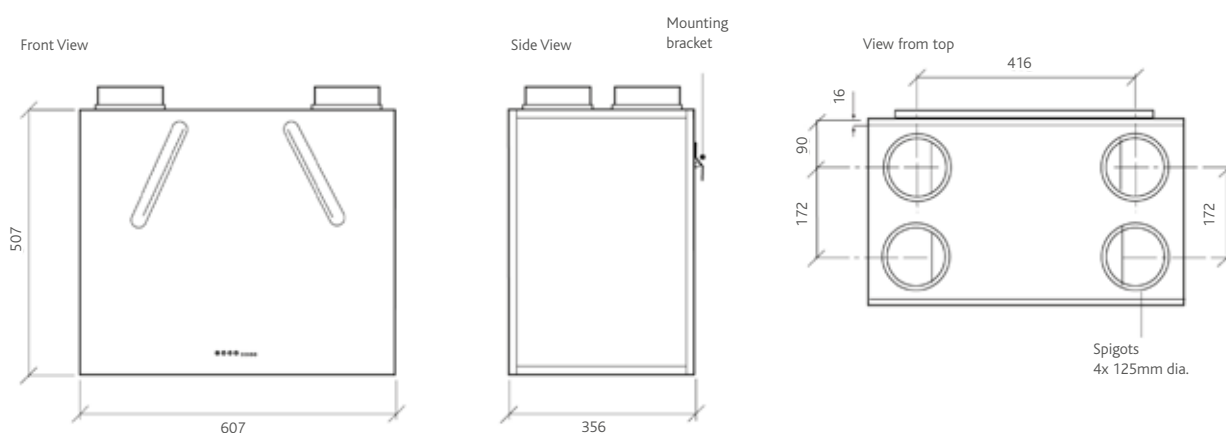
Spigot 1. 125mm dia. = Extract air from dwelling.
Spigot 2. 125mm dia. = Extract air to outside.
Spigot 3. 125mm dia. = Intake air from outside.
Spigot 4. 125mm dia. = Supply air to property



Technical - MRXBOX(AB)-ECO2 ▼

DIMENSIONS (mm)

Weight - 20kg



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.

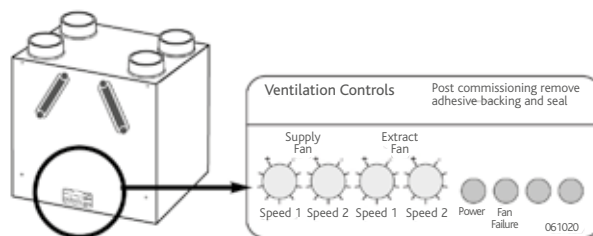
NOTE: This unit must be earthed.

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

Electrical Details: MRXBOX(AB)-ECO2

Voltage:	230V 1ph 50Hz
Consumption:	1.2 Amp

Detail of unit control on front panel.

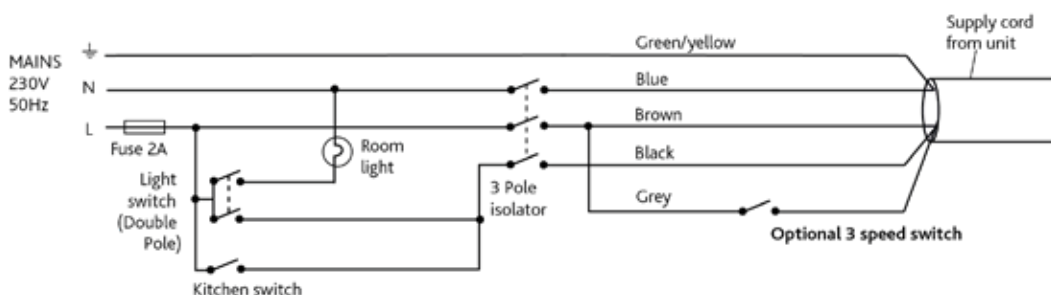


Tamper proof label following commissioning, includes system status indication.

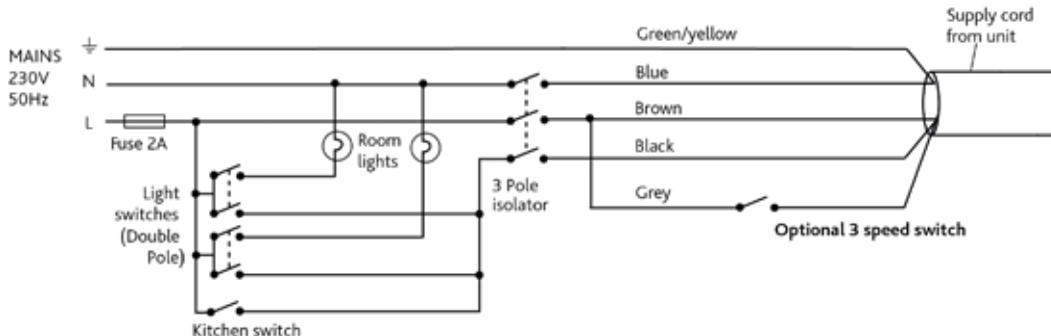
MRXBOXAB-ECO2 & MRXBOX-ECO2

Wiring - MRXBOX(AB)-ECO2 ▼

UNIT SERVING KITCHEN & BATHROOM



UNIT SERVING KITCHEN & TWO BATHROOMS



Optional Sensors and Detectors ▼

Customise MRXBOX(AB)-ECO2 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 125mm 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-ECO2 or MRXBOXAB-ECO2 as manufactured by Nuaire and shall be listed on the SAP PCDB.

MRXBOX-ECO2-OH and MRXBOXAB-ECO2-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-ECO2 & MRXBOXAB-ECO2-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-ECO2 & MRXBOXAB-ECO2-OH)

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.
- Remote fail indicator (part number MRXBOX95-RFI).
- 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 MRXBOXAB-ECO2 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.

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.

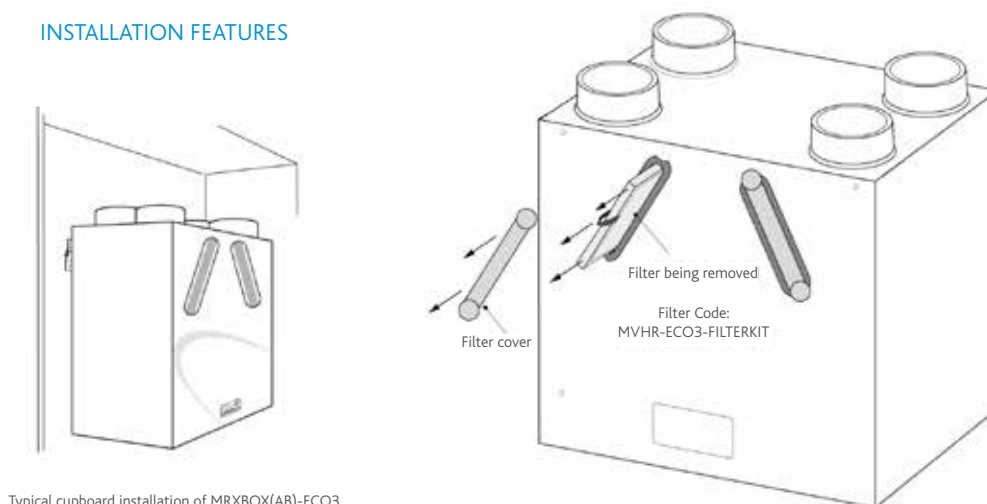
The MRXBOXAB-ECO3 has a Summer bypass function. In warmer months this function automatically activates to ensure the property is being well-ventilated and comfort levels are maintained in the home by continuously drawing in fresh filtered air into the habitable rooms.



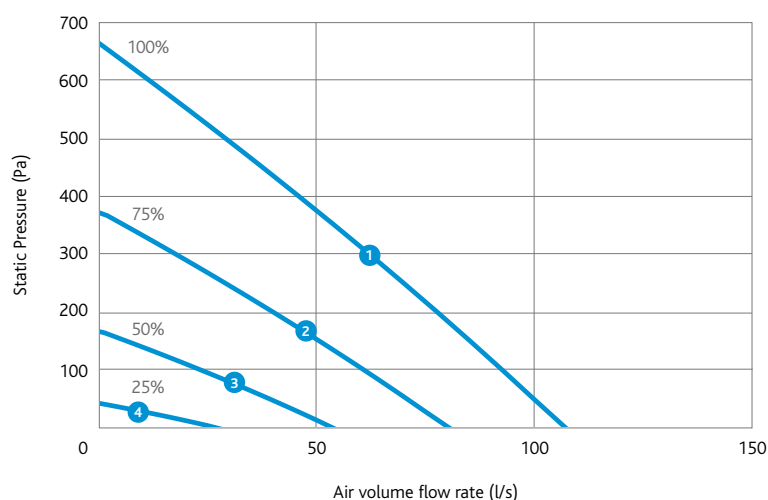
Mounting Bracket on wall and rear of unit

Typical Installation ▼

INSTALLATION FEATURES



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.

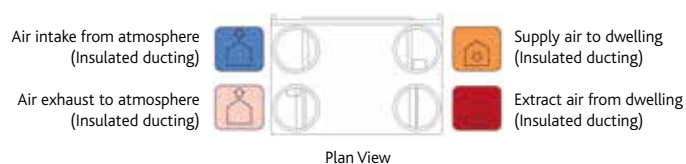
Electrical & Sound ▼

Curve	Maximum power consumption (Watts)		Sound Power Levels dB re 1pW (Frequency Hz)								dBA @3m
			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

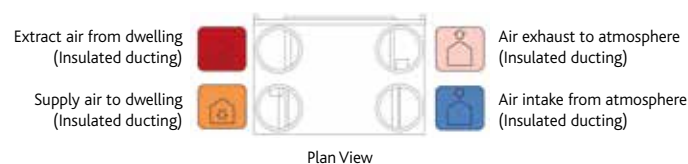
The maximum power consumption shown above (Watts) is consumed on units running continuously, not taking into account any heat recovery saving and based on SAP Product Characteristic Database (PCDB) testing. The breakout case-radiated dBA values are given for Hemispherical free field radiation at 3m - 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 Nuaire's fan selector or call the office on 029 2085 8500.

Standard Handing



Opposite Handing



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

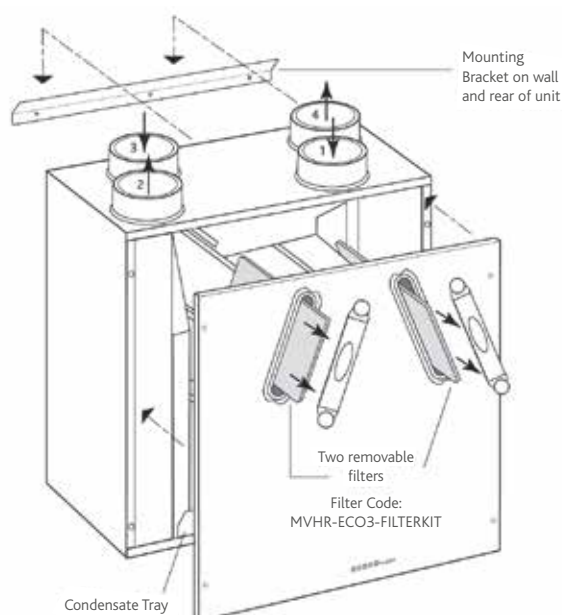
SAP 2012 Test Results ▼

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 ▼

SPIGOT LOCATION & DUCTING REFERENCES

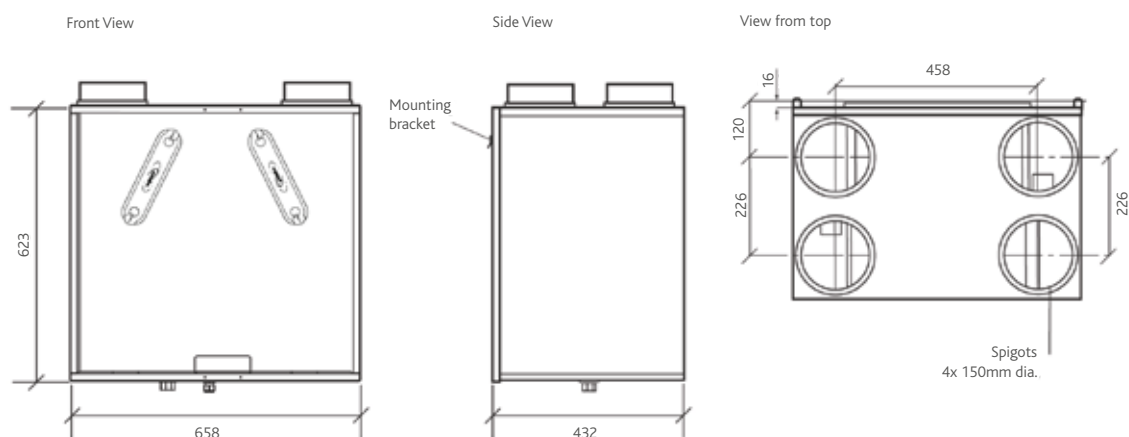
Spigot 1. 150mm dia. = Extract air from dwelling.
 Spigot 2. 150mm dia. = Extract air to outside.
 Spigot 3. 150mm dia. = Intake air from outside.
 Spigot 4. 150mm dia. = Supply air to property



Technical - MRXBOX(AB)-ECO2 ▼

DIMENSIONS (mm)

Weight - 24kg



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.

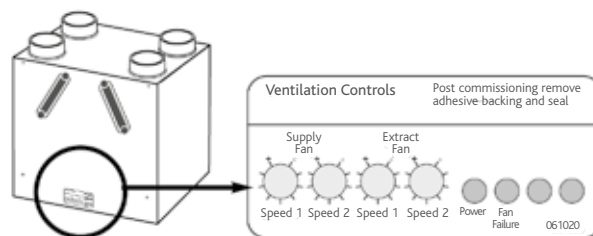
The mains power supply cable should be connected to a fixed wiring installation in accordance with current IEE wiring regulations.

Electrical Details: MRXBOX(AB)-ECO3

Voltage: 230V 1ph 50Hz

Consumption: 1.2 Amp

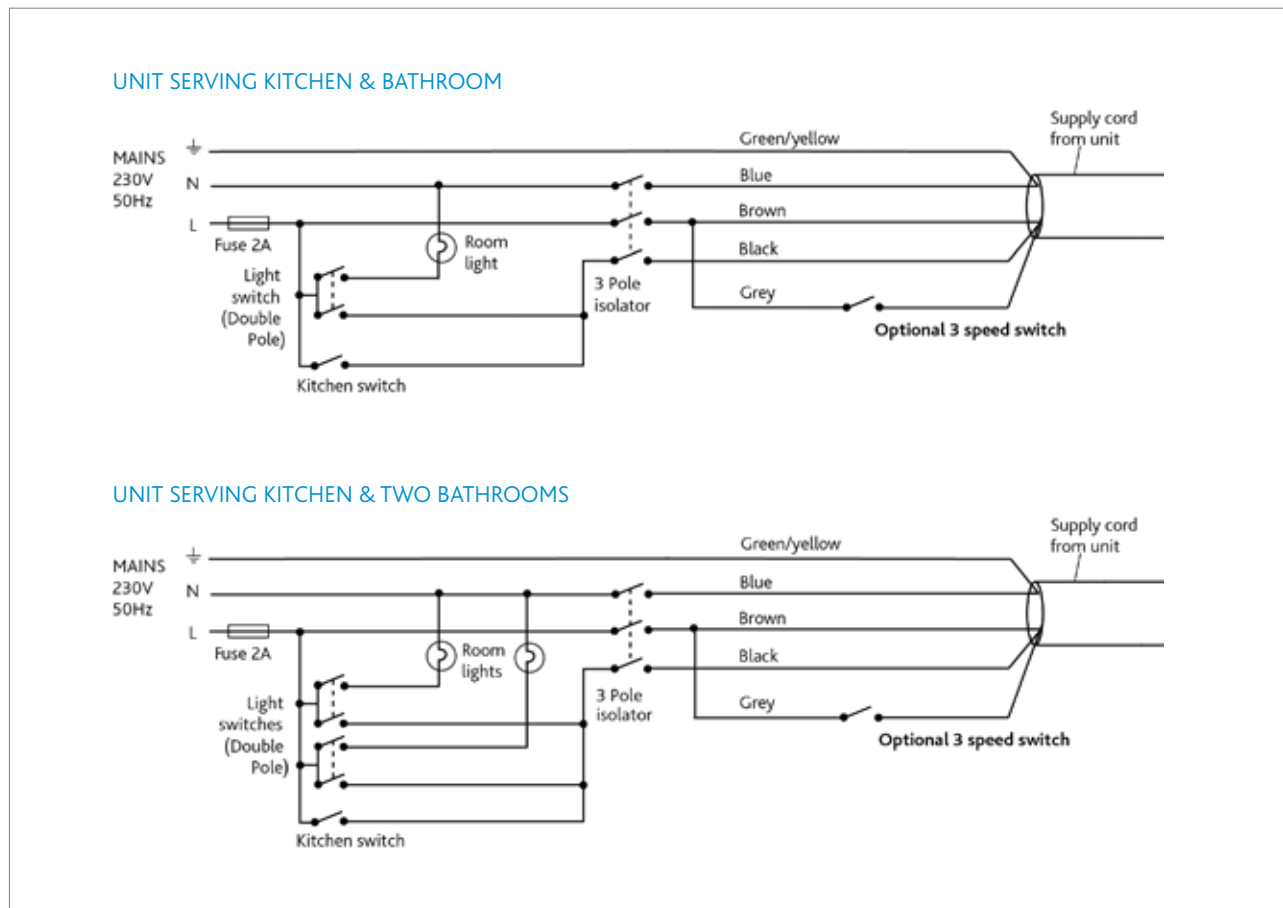
Detail of unit control on front panel.



Tamper proof label following commissioning, includes system status indication.

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.

THE CHARTER – CURO LIVING**TECHNICAL SUBMISSION – TS – 113 – DUCT ATTENUATORS**

REFERENCE	THE CHARTER – DUCT ATTENUATORS
DESCRIPTION	DUCT ATTENUATORS
MANUFACTURER	DOMUS
ADDRESS	BLOCK C
	CAERPHILLY BUSINESS PARK
	CAERPHILLY
	CF83 3ED
TEL	03443 715523
WEB	www.domusventilation.co.uk
EMAIL	vent.info@domusventilation.co.uk
MODEL	MICROBAN PROTECTED RIGID DUCT ATTENUATORS
SIZE	204 X 60 MM
ATTENUATOR SPECIFICATION	SINGLE RIGID DUCT ATTENUATOR WILL ABSORB NO LESS THAN 19dB
MATERIALS	HIGH DENSITY RECONSTITUTED PVC/NITRILE FOAM WITH A DENSITY OF 240KG/M3
ATTACHMENTS	DOMUS VENTILATION MICROBAN PROTECTED RIGID DUCT ATTENUATORS DATASHEET
REVISION	C01

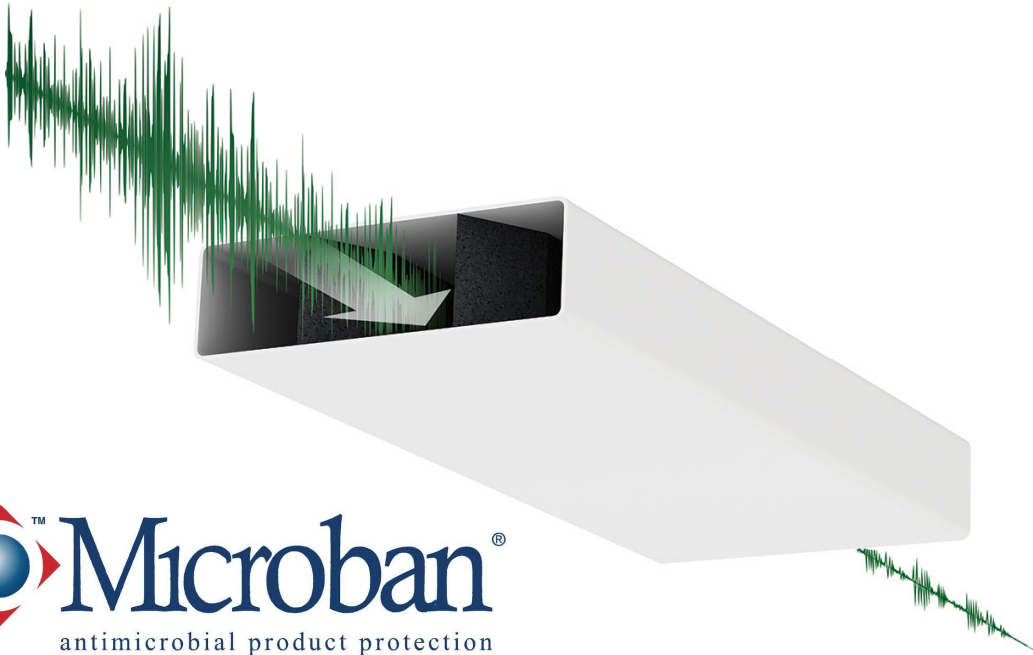
NAME	COMPANY	DATE	STATUS
	CURO CONSTRUCTION		
STATUS A = PROCEED NO COMMENTS, B = PROCEED WITH COMMENTS, C = RE-SUBMIT			
COMMENTS			



Specification

For

Microban® Protected Rigid Duct Attenuators



Contents	Page
Scope of Works	3
Manufacturer	3
Product Range	3
Materials	4
Size	4
Performance Data	4
Appendix A – Range Details	5

Scope of Works

Rigid Duct Attenuators

204x60mm | Bathroom, toilet, utility room, kitchen and whole house application

220x90mm | Kitchen and whole house application

A rigid duct attenuator (also known as a Silencer) shall be installed in a dwelling to reduce noise generated by a mechanical extract appliance and cross talk travelling between rooms in duct systems.

Approved Document F of the Building Regulations (F1 Means of Ventilation) stipulates that the system should not produce excessive noise that could discourage occupants from using it correctly. A rigid duct attenuator should therefore form part of duct system to ensure occupants do not incorrectly alter the performance of the system and as a consequence, detrimentally impact indoor air quality.

Depending on the floor area and connection size to the mechanical extract unit, either a Domus 204x60mm or Domus 220x90mm profile shall be installed in 0.5m lengths. The rigid duct attenuator shall form part of a full Domus air-tight rigid duct system to ensure the integrity and performance of the full ventilation system.

At a sound level of 1000Hz, where the typical frequency of consonants necessary for speech intelligibility begins, a single rigid duct attenuator shall absorb no less than 19dB for the 204x60mm profile and 15.5dB for the 220x90mm profile.

Close-coupling up to three 0.5m rigid duct attenuators shall reduce sound levels by no less than 55dB for the 204x60mm profile and 50.1dB for the 220x90mm profile.

The rigid duct attenuator shall include Microban® protected high density reconstituted PVC/nitrile foam, with a density of 240kg/m³. The foam shall be flame retardant, compliant to BS476 Part 7 Class 1, UL94-HF1, UL94-V0 (tested by Warrington Bodycote) and FMVSS 302.

The sound attenuation results of the rigid duct attenuator shall have been verified by SRL Technical Services Limited.

Manufacturer

Domus Ventilation

Product Range

Domus | part of the Domus 204x60mm Supertube and Domus 220x90mm systems

Materials

Duct attenuator: PVC plastic ducting

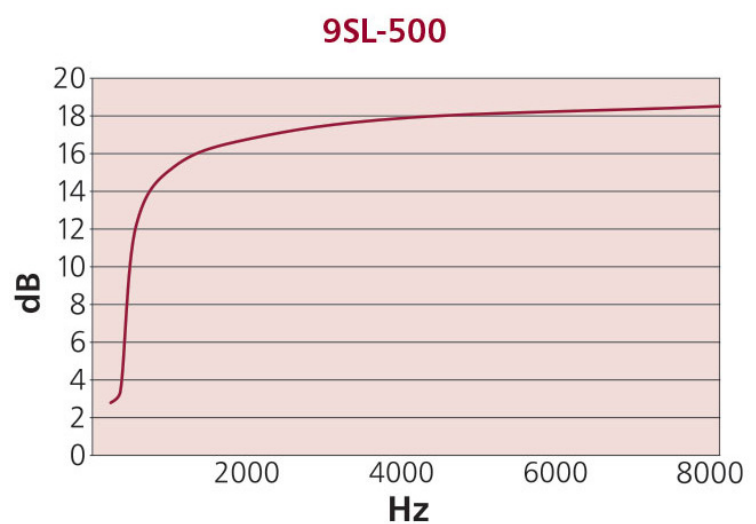
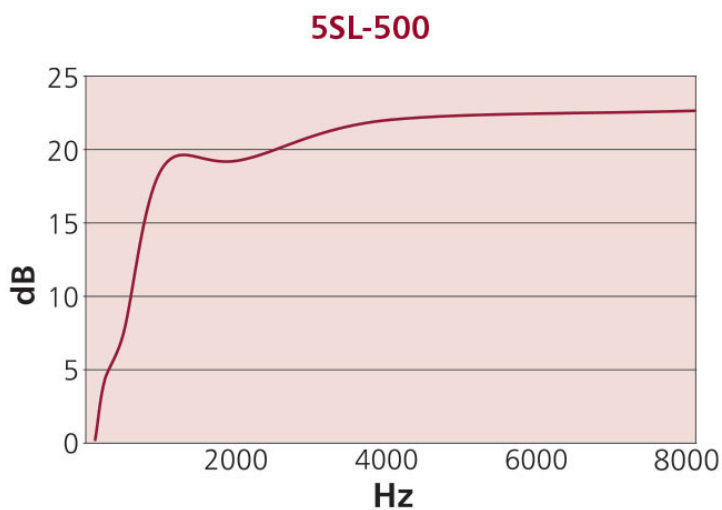
Acoustic Foam Material: High Density Reconstituted PVC/Nitrile Foam with a density of 240kg/m³. Foam contains a unique uniform cell structure, offering excellent sound absorption properties, particularly at low frequency. Flame Retardant, compliant to BS476 Part 7 Class 1, UL94-HF1, UL94-V0 (tested by Warrington Bodycote) and FMVSS 302.

Size

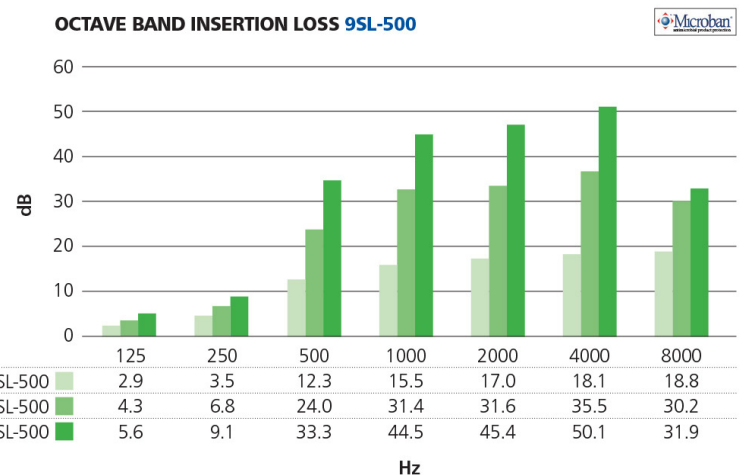
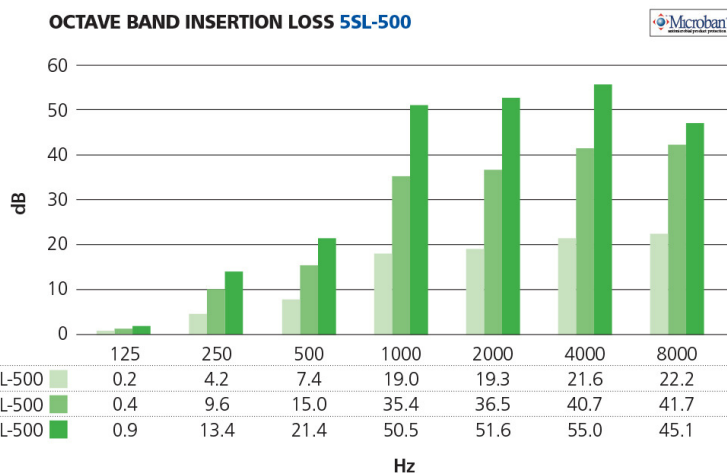
204x60mm and 220x90mm profiles

Performance Data

Acoustic Sound Results - Attenuation



Cumulative Length Acoustic Sound Results



Appendix A

Range Details

Domus 204x60mm Microban® Protected Rigid Duct Attenuator
Domus 220x90mm Microban® Protected Rigid Duct Attenuator

Codes:

Product Code	Description	Box Qty
5SL-500	Microban rigid duct attenuators (Silencers) 204x60mm, 0.5m	1
9SL-500	Microban rigid duct attenuators (Silencers) 220x90mm, 0.5m	1



Appendix B – Commissioning Reports

VENTILATION COMPLETION CERTIFICATE

PART 1 – SYSTEM DETAILS AND DECLARATIONS



**Integrated Mechanical,
Electrical & Plumbing
Services**

Watkins House, Leigh Road,
Haine Business Park,
Ramsgate, Kent, CT12 5EU
01843 852277
info@watkins.co.uk
watkins.co.uk

INSTALLATION ADDRESS DETAILS

SITE AND BUILDER	The charter Curo
PLOT NUMBER	Plot E030302
PROPERTY NO AND ROAD NAME	22
TOWN	10 BULL YARD
COUNTY	Gravesend london
POST CODE	DA122FY

INSTALLATION DETAILS

SYSTEM CLASSIFICATION	SYSTEM 1	BACKGROUND VENTILATION
	SYSTEM 2	PASSIVE STACK VENTILATION
	SYSTEM 3	CONTINUOUS MECHANICAL EXTRACT – CENTRALISED OR DE CENTRALISED.
	SYSTEM 4 	CONTINUOUS MECHANICAL SUPPLY AND EXTRACT VENTILATION WITH HEAT RECOVERY.

ENTER SYSTEM 1 TO 4 AS DEFINED BY APPROVED DOCUMENT F 2010

MANUFACTURER	Nuaire MRXBOX
MODEL NUMBERS	MRXBOXAB-ECO2-OH
SERIAL NUMBER	5534536
LOCATIONS & NUMBER OF FAN UNITS	Utility

PART 2A - INSTALLATION DETAILS

INSTALLATION CHECKLIST – GENERAL (ALL SYSTEMS)

HAS THE SYSTEM BEEN INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS?	YES		NO	
HAVE RELEVANT SYSTEM INSTALLATION CLAUSES BEEN FOLLOWED AS DETAILED IN TABLES 1, 3, 5 AND 7 AS APPLICABLE?	YES		NO	
TYPE OF DUCTWORK INSTALLED (E.G.) RIGID, SEMI-RIGID	Rigid			
IF ANY DEVIATION FROM TABLES 1, 3, 5 AND 7, THESE SHOULD BE DETAILED HERE.	N/a			
DESCRIPTION OF INSTALLED CONTROLS (E.G. TIMER, CENTRAL CONTROL, HUMIDISTAT, PIR, ETC.)	Humidistat / lights / boost switch			
LOCATION OF MANUAL / OVERRIDE CONTROLS	Utility			

PART 2B INSPECTION OF INSTALLATION
THIS SECTION SHOULD BE COMPLETED BEFORE COMPLETING PART 3.

VISUAL INSPECTIONS – GENERAL (ALL SYSTEMS)

TOTAL INSTALLED EQUIVALENT AREA OF BACKGROUND VENTILATORS IN DWELLING?	Na	MM	Na	
TOTAL FLOOR AREA OF DWELLING?	51	M ²	M2	
DOES THE TOTAL INSTALLED EQUIVALENT VENTILATOR AREA MEET THE REQUIREMENTS GIVEN IN TABLES 5.2A, 5.2B, 5.2C IN ADF?	YES	✓	NO	
HAVE ALL BACKGROUND VENTILATORS BEEN LEFT IN THE OPEN POSITION?	YES	✓	NO	
HAVE THE CORRECT NUMBER AND LOCATION OF EXTRACT FANS/TERMINALS BEEN INSTALLED THAT SATISFY TABLE 5.2 IN ADF?	YES	✓	NO	
IS THE INSTALLATION COMPLETE WITH NO OBVIOUS DEFECTS PRESENT?	YES	✓	NO	
DO ALL INTERNAL DOORS HAVE SUFFICIENT UNDERCUT TO ALLOW AIR TRANSFER BETWEEN ROOMS (I.E. 10MM OVER AND ABOVE FINAL FLOOR FINISH)?	YES	✓	NO	
HAS ALL PROTECTION/PACKAGING BEEN REMOVED (INCLUDING FROM BACKGROUND VENTILATORS) SUCH THAT SYSTEM IS FULLY FUNCTIONAL?	YES	✓	NO	
FOR DUCTED SYSTEMS, HAS THE DUCTWORK INSTALLATION BEEN INSTALLED IN SUCH MANNER THAT AIR RESISTANCE AND LEAKAGE IS KEPT TO A MINIMUM?	YES	✓	NO	
ARE THE CORRECT NUMBER AND SIZE OF BACKGROUND VENTILATORS PROVIDED THAT SATISFY ADF?	YES	✓	NO	
HAS THE ENTIRE SYSTEM BEEN INSTALLED SUCH THAT THERE IS SUFFICIENT ACCESS FOR ROUTINE MAINTENANCE AND REPAIR / REPLACEMENT OF COMPONENTS?	YES	✓	NO	

MVHR UNIT

CONDENSE DRAIN CONNECTED TO WASTE WITH HEP20 TRAP – NO TUNDISH	YES	✓	NO	
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VISUAL INSPECTIONS – GENERAL (SYSTEMS 3 AND 4 ONLY)

HAVE APPROPRIATE AIR TERMINAL DEVICES BEEN INSTALLED TO ALLOW SYSTEM BALANCE?	YES	✓	NO	
HAS THE HEAT RECOVERY UNIT (SYSTEM 4 ONLY) AND ALL DUCTWORK BEEN EFFECTIVELY INSULATED WHERE INSTALLED IN UNHEATED SPACES?	YES	✓	NO	
CONDENSATE CONNECTION IS COMPLETE AND DRAINS TO AN APPROPRIATE LOCATION (SYSTEM 4 ONLY)?	YES	✓	NO	
HAVE ALL FILTERS BEEN CLEANED AND REPLACED?	YES	✓	NO	

OTHER INSPECTIONS – GENERAL (SYSTEMS 1, 3 AND 4 ONLY)

UPON INITIAL START-UP, WAS ANY ABNORMAL SOUND OR VIBRATIONS EXPERIENCED, OR UNUSUAL SMELLS DETECTED?	YES		NO	✓
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PART 3 - AIR FLOW MEASUREMENT TEST AND COMMISSIONING DETAILS

TEST EQUIPMENT

SCHEDULE OF AIR FLOW MEASUREMENT EQUIPMENT USED (MODEL AND SERIAL)		DATE OF LAST UKAS CALIBRATION
1.	Testo 417	Within first year new
2.		

AIR FLOW MEASUREMENTS (EXTRACT) – SYSTEMS 3 AND 4 ONLY

ROOM REFERENCE (LOCATION OF TERMINALS)	MEASURED AIR FLOW HIGH RATE (l/s)	DESIGN AIR FLOW HIGH RATE (l/s) REFER TO TABLE 5.1A IN ADF	MEASURED AIR FLOW LOW RATE (l/s)	DESIGN AIR FLOW LOW RATE (l/s) REFER TO TABLE 5.1A IN ADF
KITCHEN	AB 13.3	DB 13.	AT. 5.8	DT 5.8
BATHROOM	AB. 8	DB 8.	AT 3.5	DT 3.5
EN SUITE				
UTILITY	AB. 8.1	DB 8	AT. 3.5	DT 3.5
OTHER....				
OTHER....	B=boost T= Trickle			

AIR FLOW MEASUREMENTS (SUPPLY) – SYSTEM 4 ONLY

ROOM REFERENCE (LOCATION OF TERMINALS)	MEASURED AIR FLOW HIGH RATE (l/s)	DESIGN AIR FLOW HIGH RATE (l/s) REFER TO TABLE 5.1B IN ADF	MEASURED AIR FLOW LOW RATE (l/s)	DESIGN AIR FLOW LOW RATE (l/s) REFER TO TABLE 5.1B IN ADF
LIVING ROOM 1	AB 15	DB. 15	AT 7.8	DT. 6.7
LIVING ROOM 2 (IF PRESENT)				
DINING ROOM				
BEDROOM 1	AB. 14	DB. 14	AT 7.4	DT. 6.2
BEDROOM 2				
BEDROOM 3				
BEDROOM 4				
BEDROOM 5				
STUDY				

COMMISSIONING – SYSTEMS 3 AND 4 ONLY

HAVE CONTROLS BEEN SET-UP IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS?	YES	☒	NO	
HAVE ALL DISTRIBUTION GRILLES BEEN LOCKED TO PREVENT UNAUTHORISED ADJUSTMENT?	YES	☒	NO	

TEST ENGINEER'S DETAILS

NAME	Jason white
COMPANY	C . Watkins
ADDRESS	Leigh Road Haine buisness Park
POST CODE	Ct12 5eu
SIGNATURE	
COMPETENT PERSON SCHEME/REGISTRATION NUMBER (IF APPLICABLE)	22/DV-2/138/1730
DATE OF TEST	11 November 2025

NOTES

26. EXTRACTOR GRILLES TO BE PRESENT IN EACH OF THE FOLLOWING:

- KITCHEN/LIVING ROOM
- UTILITY STORES
- BATHROOMS
- ENSUITES
- KITCHEN

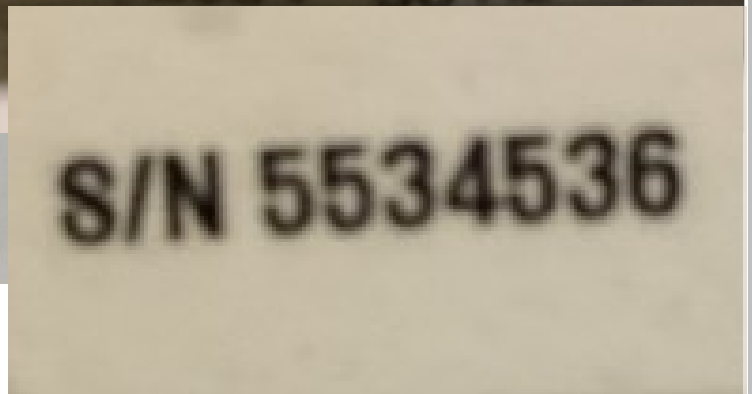
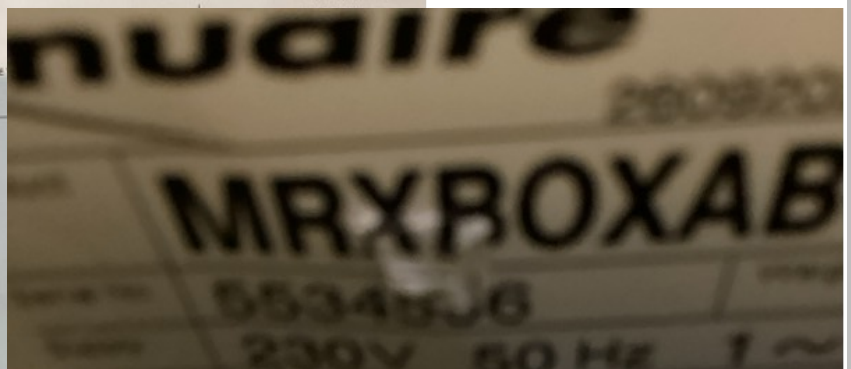
27. FLATS WITH 2 LEVELS ARE TO HAVE 10mm ALLOWANCE LOCATED WITHIN UTILITY STORE GRILLES ON FLOOR ABOVE OR BELOW (WHICHEVER IS RELEVANT TO FLAT IN QUESTION)

UNIT REF.	SYSTEM	MANUFACTURER	MODEL
MAIN 2	4	NEARIE	WINDUP MECHANISM STANDARD HAND

VENTILATION COMMISSIONING			
TYPE: 1B2P APARTMENT 002			
EXTRACT			
REF	ROOM	TRICKLE	BOOST
EX-01	KITCHEN	5.8	13
EX-02	BATHROOM	3.5	8
EX-03	UTILITY	3.5	8
TOTALS		13	29

SUPPLY			
REF	ROOM	TRICKLE	BOOST
SU-01	LIVING ROOM	6.7	15
SU-02	BEDROOM 1	6.2	14
TOTALS		13	29

NO PURGE FUNCTION ALLOWED WITHIN DESIGN



Plot E3-03-02 Plot 235
Area 51m² 1B2P
SN 5534536
Boost ✓
BA ✓ R.
Ex 10 1A 8D BA
KIT 5.8 5.8 13 13.3
BHL 3.5 3.5 8 8
UTIL 3.5 3.5 8 8.1
Sop. 13 29
Liv 6.7 7.8 15 15
BI 6.2 7.4 14 14
13 29
13.28x R. 21.

VENTILATION COMPLETION CERTIFICATE

PART 1 – SYSTEM DETAILS AND DECLARATIONS



**Integrated Mechanical,
Electrical & Plumbing
Services**

Watkins House, Leigh Road,
Haine Business Park,
Ramsgate, Kent, CT12 5EU
01843 852277
info@watkins.co.uk
watkins.co.uk

INSTALLATION ADDRESS DETAILS

SITE AND BUILDER	The charter Curo
PLOT NUMBER	Plot E030303
PROPERTY NO AND ROAD NAME	23
TOWN	10 BULL YARD
COUNTY	Gravesend london
POST CODE	DA122FY

INSTALLATION DETAILS

SYSTEM CLASSIFICATION	SYSTEM 1	BACKGROUND VENTILATION
	SYSTEM 2	PASSIVE STACK VENTILATION
	SYSTEM 3	CONTINUOUS MECHANICAL EXTRACT – CENTRALISED OR DE CENTRALISED.
	SYSTEM 4 	CONTINUOUS MECHANICAL SUPPLY AND EXTRACT VENTILATION WITH HEAT RECOVERY.

ENTER SYSTEM 1 TO 4 AS DEFINED BY APPROVED DOCUMENT F 2010

MANUFACTURER	Nuaire MRXBOX
MODEL NUMBERS	MRXBOXAB-ECO2-OH
SERIAL NUMBER	5534535
LOCATIONS & NUMBER OF FAN UNITS	Utility

PART 2A - INSTALLATION DETAILS

INSTALLATION CHECKLIST – GENERAL (ALL SYSTEMS)

HAS THE SYSTEM BEEN INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS?	YES		NO	
HAVE RELEVANT SYSTEM INSTALLATION CLAUSES BEEN FOLLOWED AS DETAILED IN TABLES 1, 3, 5 AND 7 AS APPLICABLE?	YES		NO	
TYPE OF DUCTWORK INSTALLED (E.G.) RIGID, SEMI-RIGID	Rigid			
IF ANY DEVIATION FROM TABLES 1, 3, 5 AND 7, THESE SHOULD BE DETAILED HERE.	N/a			
DESCRIPTION OF INSTALLED CONTROLS (E.G. TIMER, CENTRAL CONTROL, HUMIDISTAT, PIR, ETC.)	Humidistat / lights / boost switch			
LOCATION OF MANUAL / OVERRIDE CONTROLS	Utility			

PART 2B INSPECTION OF INSTALLATION
THIS SECTION SHOULD BE COMPLETED BEFORE COMPLETING PART 3.

VISUAL INSPECTIONS – GENERAL (ALL SYSTEMS)

TOTAL INSTALLED EQUIVALENT AREA OF BACKGROUND VENTILATORS IN DWELLING?	Na	MM	Na	
TOTAL FLOOR AREA OF DWELLING?	51	M ²	M2	
DOES THE TOTAL INSTALLED EQUIVALENT VENTILATOR AREA MEET THE REQUIREMENTS GIVEN IN TABLES 5.2A, 5.2B, 5.2C IN ADF?	YES	✓	NO	
HAVE ALL BACKGROUND VENTILATORS BEEN LEFT IN THE OPEN POSITION?	YES	✓	NO	
HAVE THE CORRECT NUMBER AND LOCATION OF EXTRACT FANS/TERMINALS BEEN INSTALLED THAT SATISFY TABLE 5.2 IN ADF?	YES	✓	NO	
IS THE INSTALLATION COMPLETE WITH NO OBVIOUS DEFECTS PRESENT?	YES	✓	NO	
DO ALL INTERNAL DOORS HAVE SUFFICIENT UNDERCUT TO ALLOW AIR TRANSFER BETWEEN ROOMS (I.E. 10MM OVER AND ABOVE FINAL FLOOR FINISH)?	YES	✓	NO	
HAS ALL PROTECTION/PACKAGING BEEN REMOVED (INCLUDING FROM BACKGROUND VENTILATORS) SUCH THAT SYSTEM IS FULLY FUNCTIONAL?	YES	✓	NO	
FOR DUCTED SYSTEMS, HAS THE DUCTWORK INSTALLATION BEEN INSTALLED IN SUCH MANNER THAT AIR RESISTANCE AND LEAKAGE IS KEPT TO A MINIMUM?	YES	✓	NO	
ARE THE CORRECT NUMBER AND SIZE OF BACKGROUND VENTILATORS PROVIDED THAT SATISFY ADF?	YES	✓	NO	
HAS THE ENTIRE SYSTEM BEEN INSTALLED SUCH THAT THERE IS SUFFICIENT ACCESS FOR ROUTINE MAINTENANCE AND REPAIR / REPLACEMENT OF COMPONENTS?	YES	✓	NO	

MVHR UNIT

CONDENSE DRAIN CONNECTED TO WASTE WITH HEP20 TRAP – NO TUNDISH	YES	✓	NO	
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VISUAL INSPECTIONS – GENERAL (SYSTEMS 3 AND 4 ONLY)

HAVE APPROPRIATE AIR TERMINAL DEVICES BEEN INSTALLED TO ALLOW SYSTEM BALANCE?	YES	✓	NO	
HAS THE HEAT RECOVERY UNIT (SYSTEM 4 ONLY) AND ALL DUCTWORK BEEN EFFECTIVELY INSULATED WHERE INSTALLED IN UNHEATED SPACES?	YES	✓	NO	
CONDENSATE CONNECTION IS COMPLETE AND DRAINS TO AN APPROPRIATE LOCATION (SYSTEM 4 ONLY)?	YES	✓	NO	
HAVE ALL FILTERS BEEN CLEANED AND REPLACED?	YES	✓	NO	

OTHER INSPECTIONS – GENERAL (SYSTEMS 1, 3 AND 4 ONLY)

UPON INITIAL START-UP, WAS ANY ABNORMAL SOUND OR VIBRATIONS EXPERIENCED, OR UNUSUAL SMELLS DETECTED?	YES		NO	✓
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PART 3 - AIR FLOW MEASUREMENT TEST AND COMMISSIONING DETAILS

TEST EQUIPMENT

SCHEDULE OF AIR FLOW MEASUREMENT EQUIPMENT USED (MODEL AND SERIAL)		DATE OF LAST UKAS CALIBRATION
1.	Testo 417	Within first year new
2.		

AIR FLOW MEASUREMENTS (EXTRACT) – SYSTEMS 3 AND 4 ONLY

ROOM REFERENCE (LOCATION OF TERMINALS)	MEASURED AIR FLOW HIGH RATE (l/s)	DESIGN AIR FLOW HIGH RATE (l/s) REFER TO TABLE 5.1A IN ADF	MEASURED AIR FLOW LOW RATE (l/s)	DESIGN AIR FLOW LOW RATE (l/s) REFER TO TABLE 5.1A IN ADF
KITCHEN	AB 13.8	DB 13.	AT. 6.5	DT 5.8
BATHROOM	AB. 8.8	DB 8.	AT 3.9	DT 3.5
EN SUITE				
UTILITY	AB. 8.7	DB 8	AT. 3.7	DT 3.5
OTHER....				
OTHER....	B=boost T= Trickle			

AIR FLOW MEASUREMENTS (SUPPLY) – SYSTEM 4 ONLY

ROOM REFERENCE (LOCATION OF TERMINALS)	MEASURED AIR FLOW HIGH RATE (l/s)	DESIGN AIR FLOW HIGH RATE (l/s) REFER TO TABLE 5.1B IN ADF	MEASURED AIR FLOW LOW RATE (l/s)	DESIGN AIR FLOW LOW RATE (l/s) REFER TO TABLE 5.1B IN ADF
LIVING ROOM 1	AB 15.2	DB. 15	AT 6.7	DT. 6.7
LIVING ROOM 2 (IF PRESENT)				
DINING ROOM				
BEDROOM 1	AB. 15.3	DB. 14	AT 6.3	DT. 6.2
BEDROOM 2				
BEDROOM 3				
BEDROOM 4				
BEDROOM 5				
STUDY				

COMMISSIONING – SYSTEMS 3 AND 4 ONLY

HAVE CONTROLS BEEN SET-UP IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS?	YES	☒	NO	
HAVE ALL DISTRIBUTION GRILLES BEEN LOCKED TO PREVENT UNAUTHORISED ADJUSTMENT?	YES	☒	NO	

TEST ENGINEER'S DETAILS

NAME Jason white

COMPANY C . Watkins

ADDRESS Leigh Road
Haine buisness Park

POST CODE Ct12 5eu

SIGNATURE

COMPETENT PERSON SCHEME/REGISTRATION NUMBER (IF APPLICABLE) 22/DV-2/138/1730

DATE OF TEST 11 November 2025

NOTES

EO303 Plots 2 3

P22 10 Ball yard of k DAZZY

23

13

Tt = TB x R = T.

VENTILATION UNIT SCHEDULE			
UNIT REF.	SYSTEM	MANUFACTURER	MODEL
MVR1	4	NAME	MTX500 AD EDCO (1100/500/1000)

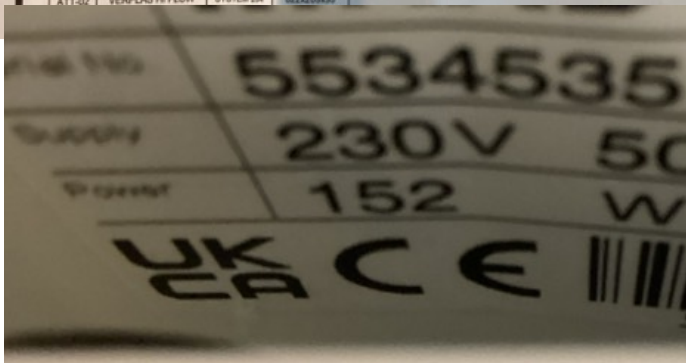
VENTILATION COMMISSIONING			
TYPE: 1B2P APARTMENT 002			
EXTRACT			
REF	ROOM	TRICKLE	BOOST
EX-01	KITCHEN	5.8	13
EX-02	BATHROOM	3.5	8
EX-03	UTILITY	3.5	8
TOTALS		13	29

SUPPLY			
REF	ROOM	TRICKLE	BOOST
SU-01	LIVING ROOM	6.7	15
SU-02	BEDROOM 1	6.2	14
TOTALS		13	29

NO PURGE FUNCTION ALLOWED WITHIN DESIGN

ATTENUATION SCHEDULE			
TYPE: 1B2P APARTMENT 002			
EXHAUST & FRESH AIR			
REF	MANUFACTURER	MODEL	DMS
ATT-02	VERPLAS HI FLOW	SYSTEM 254	622x209x95

EXTRACT & SUPPLY			
REF	MANUFACTURER	MODEL	DMS
ATT-02	VERPLAS HI FLOW	SYSTEM 254	622x209x95



Plot EO3-03-03 Plot 236

Area 51m²

DN 5534535.

Boost /

3A ✓

	TD	TA	BD	BA.
Ext.	5.8	6.5	13	13.8
Kit	3.5	3.9	8	8.8
BL.	3.5	3.7	8	8.7
Util	6.7	6.7	15	15.2
Sup	6.2	6.3	14	15.3

Tt = TB x R = T.



Contact details:

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