warranty
LABC

TECHNICAL MANUAL

VERSION 11

16: VENTILATION AND EXTRACTION

16. Ventilation and Extraction

Contents

Functional Requirements

16.1 General Requirements

Limitations of Functional Requirements

1. These Functional Requirements do not and will not apply to create any policy liability for any remedial works carried out by the contractor or otherwise, nor to any materials used in those remedial works).
2. The guidance provided in this Section, is guidance that provides a suggested solution to meeting the Functional Requirements. If an alternative solution is selected, then this must still meet the Functional Requirements.
3. The occurrence of high indoor temperatures, and the measures to mitigate or control, are a health and welfare matter that is outside the scope of our Warranty that will need agreement with your Building Control provider.
4. Means of escape, passive and active systems are not covered by the Warranty.

Workmanship

1. A commissioning certificate is required for any work completed by an approved installer.
2. All work is to be carried out by a technically competent person in a workmanlike manner.

Materials

1. All materials should be stored, installed and protected correctly in a manner that will not cause damage or deterioration of the product.
2. All materials, products and building systems shall be appropriately tested and approved for their intended purpose.

Design

1. Ventilation services - shall be designed, constructed and installed so that they:
    a. Provide sufficient indoor air quality;
    b. Do not adversely affect the structural stability of the building;
    c. Are constructed using non-hazardous materials;
    d. Are durable and robust;
    e. Are safe and convenient in use.
    f. Insulated to prevent unintended heat losses;
    g. Capable of being adequately controlled

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16.
Ventilation and Extraction

16.1
General Requirements

Provision of Information

A full set of design drawings and specifications shall be made available to the Warranty Provider and all other interested parties prior to the associated works starting on site.

This should include a detailed ventilation strategy defining the approach being taken, which may include, but not be limited to:

1. Fully detailed ventilation drawings, schedules and specification for the proposed system that indicate type, location and associated flow rates for all contributing elements/devices.

Prior to commencement, the Warranty Surveyor at their discretion, may also request additional supporting information that demonstrates suitability for use of any materials or systems contained within the above.

At completion, the installing contractor will be required to provide a copy of the commissioning certificate for each element of mechanical ventilation/extraction for inclusion into the home owner's information pack, which should include the flow rate confirmation as per the designed strategy at point of completion.

Ventilation strategy

The arrangement of natural ventilation and mechanical ventilation, should be designed to facilitate the exchange of air at defined rates to and from the spaces contained within a building.

The ventilation strategy may rely on a combination of natural ventilation, mechanical ventilation and purge ventilation.

Natural ventilation provision
Natural ventilation relates to air change occurring through formed openings whose operation is not reliant on mechanically driven elements (e.g. doors, windows and manually operated trickle vents) that function without the use of mechanically driven elements.

Mechanical ventilation provision
This is purpose provided ventilation which is designed into the building to provide a quantifiable and controlled rate of ventilation e.g. mechanical background ventilators, intermittent extract fans, and continuous supply/recovery of air through mechanical systems (MEV and MVHR).

Purge ventilation provision
Purge ventilation relates to ventilation that provides a rapid delivery of fresh air to a space.

Natural ventilation systems

Where doors, windows and manually operated trickle vents are provided, they must be controllable and located to avoid undue draughts. They must also be designed to prevent moisture ingress from rainfall / snow.

They should be sized and operable in accordance with the relevant Building Regulations and the rates of ventilation should be consistent with the statutory guidance e.g. Approved Documents.

Mechanical ventilation systems

Where the designed ventilation strategy requires the inclusion of purpose provided ventilation, each element should be compliant with the respective part of relevant Building Regulations and the rates of ventilation should be consistent with the statutory guidance e.g. Approved Documents.

Mechanical background ventilators
Where mechanical background ventilators are provided, e.g. Humidistats etc., they must be controllable and located to avoid undue draughts. They should be adequately protected against adverse weather and moisture ingress.

Intermittent and continuous extract fan units
Intermittently operated and continuously operated extract fans provide extract ventilation to remove odours and excessive humidity. Where the designed ventilation strategy requires the inclusion of mechanical extraction, it should be provided at rates compliant with the relevant Building Regulations and the rates of ventilation should be consistent with the statutory guidance e.g. Approved Documents.

Continuous mechanical extract (MEV) systems and Continuous mechanical supply and extract systems with heat recovery (MVHR)
Where the designed ventilation strategy such a system, it should be designed and installed to be compliant with the relevant Building Regulations and the statutory guidance e.g. Approved Documents.

The system should be designed as a complete package, the performance of all materials and components should be considered to ensure compatibility and performance of the system.

The system should:

- Be designed to ensure that a satisfactory level of performance is achieved and in accordance with statutory guidance e.g. Approved Documents.
- Ensure even distribution of airflow taking account airflow resistance, including the bends and fittings.
- Have adequate fan capacity accounting for airflow resistance of the system.
- Airflow resistance should be calculated in accordance with BS EN 13141-2 and manufacturer's data.
- Have ductwork that is as direct as possible.
- Be installed in accordance with the design and manufacturers recommendations.

Mechanical extraction rates

Room	Intermittent extract	Continuous extract
Kitchen	30 l/s adjacent to hob or 60l/s elsewhere	13 l/s
Utility	30 l/s	8 l/s
Bath/shower room/*Designated Drying Area	15 l/s	8 l/s
Sanitary accommodation	6 l/s	6 l/s

Note: *Applicable only in Scotland

Purge ventilation

Purge ventilation should be provided in accordance with the relevant Building Regulations. Purge ventilation provision is required in each habitable room and should be capable of extracting a minimum of four air changes per hour (ach) per room directly to outside.

Allowance for air movement

Ventilation strategies that rely upon air transfer throughout the dwelling, may require an undercut to internal doors. Typically this is required to be of minimum area 7600mm² in all internal doors above the floor finish which is equivalent to an undercut of 10mm for a standard 760mm width door. In such instances, the air transfer provision must be unrestricted after floor finishes have been laid (e.g. carpets should not encroach).

Note: Where fire doors are installed, reference must be made to the fire door certification for the size of allowable gaps.

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Background ventilators

Where manually operated trickle vents are installed in windows and doors, they must be correctly specified for the location and should be installed so as not cause potential damage to render finishes or restrict the ability to open the window/door. Windows with operating mechanisms that can be set in 'night vent' positions are not accepted as meeting this requirement.

Where background ventilation is provided, whether it is manually operated or mechanically delivered, it must be controllable and located to avoid undue draughts. It should be adequately protected against adverse weather and moisture ingress.

Fan units and associated plant/kit

Any fan units and/or associated plant/kit (e.g. extraction fan units, MEV/MVHR units) should be adequately fixed to a part of the building that can support the load and does not give rise to acoustic transfer as a result of their attachment and operation.

All elements should be fixed in accordance with the design and manufacturer's recommendations.

Controls

- Any manual boost controls should be provided locally to the areas being served.
- In kitchens, any automatic controls must provide sufficient flow during cooking with fossil fuels (e.g. gas) to avoid build-up of combustion products.
- Ensure the system always provides the design ventilation rates.

Access and operation

MEV systems must be installed so that:

- The fan units and controls are easily accessible.
- Identify maintenance and servicing requirements.
- Ducts and air valves should have either fitted filters or be accessible for cleaning.

Ductwork – interfacing with building fabric

The route of ductwork should take account of other building elements and where it passes through structural elements, it should not adversely affect the structural performance of the building. Where alterations to structural elements are required, this should only be carried out in accordance with the manufacturer's recommendations, or be designed by an Engineer.

Floor joists should not be excessively notched or drilled to accommodate ductwork. Further information can be found in the 'Upper Floors' section.

Detailing should allow for thermal expansion and contraction to avoid damage and noise from ductwork movement. This may result in sleeved approaches through structural elements to prevent damage and the avoidance of solidly embedding ducts with mortar.

The route of ductwork should not adversely affect the fire performance of the building fabric. Fire performance should be in accordance with Building Regulations and in accordance with the guidance of the relevant statutory guidance e.g. Approved Documents.

Issues that should be taken into account include:

- Passage through compartmentation and/or protected routes.
- The integrity of walls and floors.
- Additional requirements for flats and apartments with a floor above 4.5m.
- Impact of outlets and ducting on the building fabrics fire performance.
- The use of dampers and fire stopping to mitigate the risks.

Where proprietary fire stopping systems are used around services that penetrate fire-resisting floors, walls or partitions, they should be installed using the manufacturer's recommendations.

Further information can be found in the 'Upper Floors' and 'Internal Walls' guidance.

Ductwork installation – layout, runs and junctions

Ductwork systems should be designed by a specialist, and be installed in accordance with the manufacturer's guidance. The route of ductwork should not hinder the free flow of air or achievement of the required ventilation rates.

It is recommended that rigid ducts are used as far as practicable, and bends should generally be formed with proprietary rigid components.

Flexible ducting should only be used for final connections. Where utilised, installed ductwork lengths and sizing must be strictly in accordance with the design to avoid any loss or reduction in the designed ventilation rates. Installation should be straight and fully supported, without undulation or restrictions as result of compression or constriction.

Where flexible duct is used to form bends on an extract system, they should be restricted to a maximum of:

- Two for systems up to 30 l/s.
- One for extract rates higher than 30 l/s.

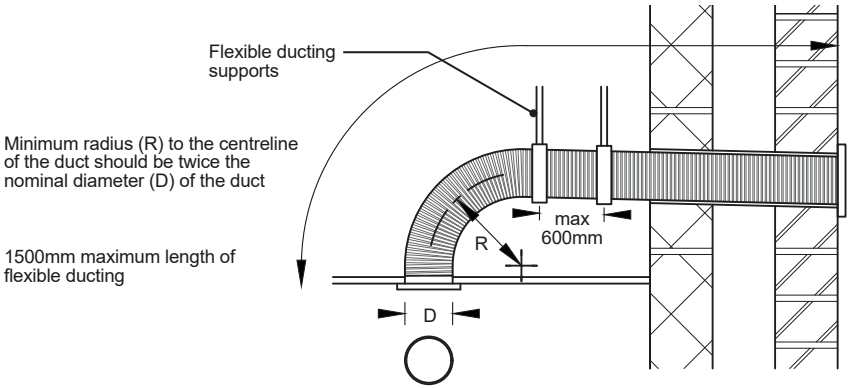
Ductwork should be securely fixed, and have adequate support throughout its length, with clips and supports for spaced at equal distances and in accordance with the ductwork manufacturer's recommendations.

All joints and connections should be mechanically fixed and sealed in accordance with ductwork manufacturer's guidance.

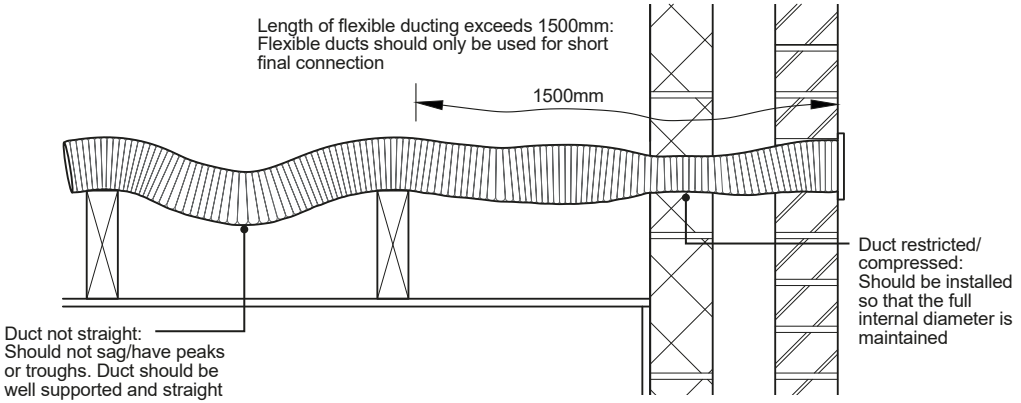
Ductwork should not be in direct contact with other surfaces, such as plasterboard ceilings, that may transfer noise to the home.

Where ductwork passes through an external wall, it should be positioned to slope slightly outwards to prevent water entering the building.

Correct duct installation



Incorrect duct installation



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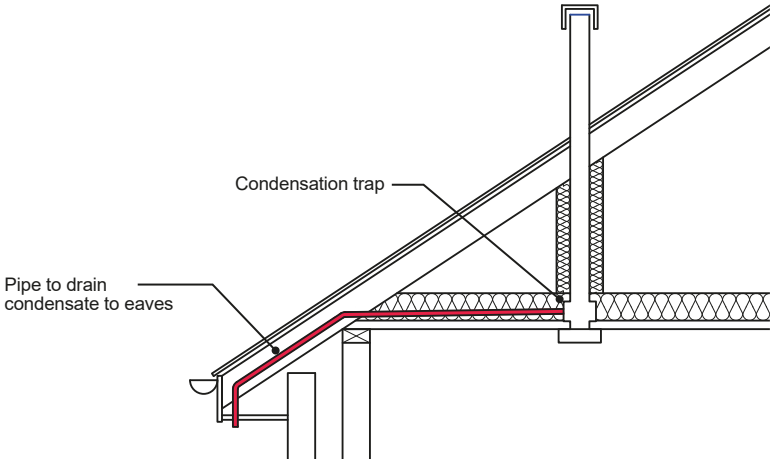
Ductwork - control of condensation

Where ductwork from extractor fans goes through unheated spaces such as roof voids, action should be taken to minimise the chance of condensation forming in the ducting and any consequential damage caused to finishes and the fan unit. To achieve this, ductwork should:

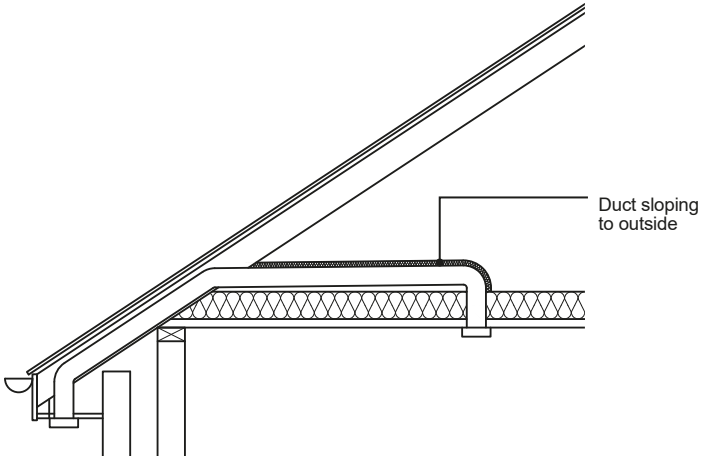
- Discharge to the outside air.
- Provide continuous insulation to the outside of the ductwork.
- Be laid to fall away from the fan.

The insulation type, thickness and thermal resistance should be included and documented within the any ventilation strategy and supporting designs. Alternatively, the ductwork can be fitted with a condensate trap that discharges to the outside or installing the duct to slope to the outside.

Insulating a vertical extract duct



Insulating a vertical extract duct



Ductwork – termination to outside air

Ventilation systems should terminate freely to open air and terminals should not adversely affect the performance of the ventilation system by restriction or resistance of air flow.

Airflow resistance data for terminals should be supplied by the manufacturer via testing in accordance with BS EN 13141-2. Where terminals are located on external walls or pass through a roof structure, these should be adequately protected against adverse weather and moisture ingress.

Where used, extracted air must discharge directly to outside air and not terminate in a manner that may allow a return of the extracted air to an internal space e.g. extraction grilles in roof soffits directly above an opening window or within 500mm of a trickle vent.

Outlets should not discharge into courtyards, enclosures or architectural screens, and should be downwind of intakes where there is a prevailing wind direction.

Addition provisions for timber frame

In addition to general provisions for the installation of ductwork, the following are of particular note where they interact with external wall in timber frame construction:

- The routing and termination of ductwork should not affect the fire resistance of the structure.
- Penetrations through the Air and Vapour Control Layers should be tight fitting to reduce air leakage and the passage of moisture vapour.
- Adequate allowance for differential movement to occur where the duct passes through any external leaf e.g. masonry.
- Ducts that pass through the external wall cavity and provide an opening should be enclosed with a cavity barrier and protected with a cavity tray.

Further information can be found in ‘External Walls – Timber Frame’.

Commissioning

Air flow rates for all fans should be measured and recorded as part of the commissioning procedure.

The measured rates should be as per the design intention. Where the rates are lower than those designed, an adjustment should be made to correct the system and all air flows should then be re-tested.

At completion, the installing contractor will be required to provide a copy of the commissioning certificate for each element of mechanical ventilation/extraction for inclusion into the home owner’s information pack, which should include the flow rate confirmation as per the designed strategy at point of completion.

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