Introduction

The aim of this guide

The aim of the guide is provide a quick reference for anyone who is on site checking an install of centralised mechanical ventilation systems, with or without heat recovery. Our ambition is to focus on the key areas of an installation that can be checked through a visual inspection. This document is not a complete manual covering design and fitting of central ventilation systems, but rather a quick reference guide enabling non-specialists to assess the most important elements.

We have tried to ensure that this is not a cumbersome document, but for further reading and support please see the references for further reading in Annex B.

What does this guide cover?

This guide concentrates primarily on centralised mechanical ventilation systems with heat recovery (MVHR). However, the guiding principles can easily also be applied to a system without heat recovery (MEV) as the core principles of design and install are the same.

Centralised mechanical ventilation systems, consist of a central unit within a home, with ductwork distribution or extracting air from individual rooms. MEV and MVHR systems extract air from the wet rooms of a home and exhaust the air to the outside. MVHR systems additionally recover the heat of the exhaust air, and use it to warm mechanically supplied fresh air which is introduced into the living rooms.

MEV system

MVHR system

Photos courtesy of Envirovent

Principles of installation

- Systems are designed so that the building will be adequately ventilated with the system running as quietly as possible.

- Poorly installed systems mean that the fans have to work harder to provide the required ventilation rates, this means that either the system will be noisy or that the design ventilation rates will not be achieved.

- Inadequate ventilation (which can also result from occupants turning off a 'noisy' system) can lead to long term air quality and health issues.

- The installation phase is the chance to get things right!

The key approach to take when checking the system installation is:

1. Only accept variations from the design on site where their impact is minimal (refer to Annex A.)

2. Check any other proposed changes with the designer.

3. Ensure that system installation follows the good practice guidance described below.

Part A - What to check before installation begins on site

1. The latest version of design drawings should be available on site, together with contact details for the designer.

2. The ventilation design drawings should say what type of ducting is required at each point.

3. Windows ordered for the properties must have the correct ventilation specification:

    - For MEV systems all windows must have suitably sized trickle vents, except for those in the wet rooms (bathrooms and kitchen.)
    - For MVHR systems no windows should have trickle vents.

Part B – What to check at first fix stage

1. The ductwork should be installed as designed wherever possible. (Refer to annex A to decide if changes need to be referred to the designer.)

2. Rigid and semi-rigid ducting should be to the designed size and without additional bends.

3. Rigid and semi-rigid ducting should not have been replaced with flexible ducting at any point.

4. Where flexible ducting is specified it should be no longer than 300mm and pulled taut.

✘

Flexi duct too long and not pulled taut

5. Joints in ductwork should be sealed so that system is airtight:
   - Flexible ducting should use a rigid connector and worm drive clip or similar (taped joints should be avoided)
   - Rigid ducts should be fixed with an acrylic, non-hardening sealant.
   - Semi-rigid ducts will typically use self-sealing O rings.

6. Rigid and semi-rigid ducting should be adequately supported with clips or banding at the required intervals.

Part C - What to check at second fix stage

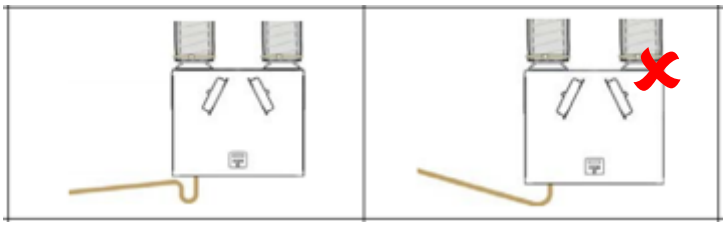
1. Central ventilation unit should be stable and level with space around it to allow maintenance.

MVHR unit mounted so that it is stable and easily accessible

Unit difficult to access & ducts compressed

2. All ductwork and pipes should be insulated where specified.

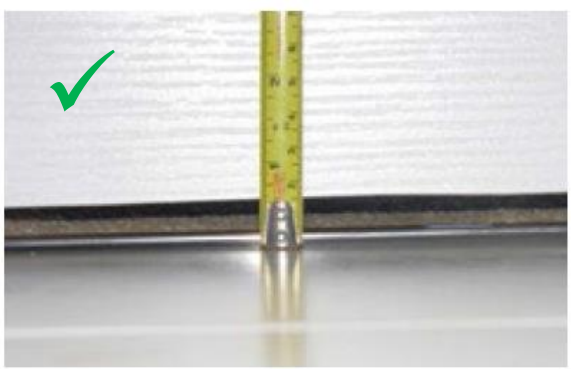
3. Condensate drains must have the correct slope so that water runs away and be fitted with a trap to prevent smells coming back into the unit.



4. Ventilation system controls must be in place, accessible and clearly labelled.

5. Check that windows have the correct trickle vents as covered in Part A.

6. Internal doors must be undercut to the correct level (10mm above the floor finish or 20mm above the floor boards if the floor finish has not been installed)



Part D - What to check at the commissioning stage

1. Observe commissioning taking place. This should involve air flow rates being checked and adjusted in each room of each property using suitable measurement equipment (see annex C).

2. Check that individuals carrying out commissioning are trained and, ideally, registered under a Competent Persons Scheme. Commissioning should take at least an hour per dwelling.

3. Valves should be open to a sufficient level (expect to see a finger width gap) in the commissioned systems so that fans are running at a low speed.

4. Check that commissioning sheets have been fully completed for each property.

5. Check that filters have been replaced or cleaned prior to handover.

6. Check that external grilles have been cleaned and are free from debris.

Part E – What to check at handover stage

1. Occupants should be provided with a full explanation of the ventilation system.

2. System information should be left with the occupants, including details of maintenance requirements.

Annex A

Centralised mechanical Ventilation Design Deviation Guidance

When deviating from the design of a central mechanical ventilation system it should be recognised that such changes will have an impact on the overall performance of the system. In particular, changes to the ductwork have the potential to increase the resistance to airflow and therefore reduce ventilation rates.

The table below gives some insight into what the impact of changes may be. Any such changes needed on site that fall into the 'major risk' category should be referred to the designer.

	Minor risk	Major risk
Duct runs	increasing number of bends and/or total length by 10% or less	Increasing number of bends and/or total length by more than 10%
		Reducing size of ductwork
Flexible ductwork		Adding flexible ductwork or
		allowing lengths of specified flexible ductwork to be over 300mm
Location of unit	If relocation is minimal and ductwork layout can be retained.	If relocation results in increased flexible ductwork or additional bends.
Supply and extract terminal locations	Small change of location to co-ordinate with lighting.	Relocation against good practice (see below.)
		Reducing size of supply and/or extract terminals

<u>Good practice location of supply and extract terminals</u>

To create cross-ventilation within a room air valves should be:

- Positioned on the opposite side of the room from internal door openings
- Not closer than 200mm to walls where located on a ceiling
- Not more than 400mmm from the ceiling where located on a wall
- Extract air valves in kitchens should be a minimum of 600mm away from hobs when measured on plan.

Air valves should be positioned to take account of:

- The likely location of tall furniture
- The avoidance of draughts over beds and seating areas

To prevent cross contamination of air, never change site specification of supply and extract to less than 300mm horizontal spacing.

Annex B

Reference documents for detailed guidance

- HM's Government Domestic Ventilation Compliance Guide
- NHBC's Technical Standards Chapter 8.3.
- SAP_AppendixQ_Semi-rigid-ducting_Specification-criteria_14.02.11
- Inspection Checklist and Air Flow Measurement Test Sheet - Dec 2011
- NHBC Building Regulations Guidance Note G272a 10/13
- BSRIA 'A Guide to Measuring air flow rates' document BG46/2015

Annex C

Guidance for air testing procedure

The Building Regulations 2010, Statutory Instrument Part 9, paragraph 42, imposes a requirement that testing and reporting of mechanical ventilation performance is conducted in accordance with an approved procedure.

Compliance with this requirement by an assessed and registered 'Competent Person' should follow a 'Best Practice' process and adopt air flow measurement, Method A – The Unconditional Method – using a suitable UKAS certified measuring instrument. Generically referred to as a 'Zero Pressure Air Flow Meter' or 'Powered Flow Meter'.

Further information on this method is detailed in NHBC Building Regulations Guidance Note G272a 10/13 and BSRIA 'A Guide to Measuring air flow rates' document BG46/2015