



May 12, 2010

Part F 2010

Introduction

The proposed amendments in the consultation version of Approved Document F (ADF) 2010 help address concerns of under-ventilation in both new dwellings and when undertaking building work in existing dwellings.

In particular, they aim to:

- Harmonise ADF with the proposed changes to Approved Document L, in particular to ensure adequate ventilation as new dwellings become more airtight;
- Improve the installation and commissioning of ventilation systems such that they operate to their design specifications.

Additional ventilation provisions are therefore recommended in ADF 2010 for homes that are designed to be more airtight than 5 m³/(h.m²).

The threshold has been set at 5 m³/(h.m²)) rather than 3 to 4 m³/(h.m²)) to provide a safety margin and reduce the risk of under-ventilation in case the as-built air permeability turns out to be better than the design value.

In the main, the ventilation system specifications have not been changed for dwellings designed to an air permeability of leakier than 5 m³/(h.m²).

There is an argument that, for simplicity, the ventilation provisions recommended for more airtight dwellings should apply to dwellings of all levels of air permeability, particularly since an increasing number of dwellings built to Part L 2010 (and beyond) standards will have an air permeability below 5m³/(h.m²).



The rationale behind having different guidance for leakier and more airtight homes is that providing additional ventilation for leakier homes could lead to additional expense and over ventilation with an increased use of energy.

ADF 2010 therefore continues to allow the use of traditional natural ventilation openings at current sizes for leakier homes.

Airflow measurements carried out in nine dwellings with Mechanical Extract Ventilation (System 3 in ADF), which were built as part of the Stamford Brook project 13, showed that in all but one case the MEV systems failed to achieve their design flow rates, in some cases by as much as 63%.

Conclusions were that the ventilation systems had not been adequately commissioned and that the poor performance was likely to be caused by high flow resistance between the fan unit and the roof outlet and also to pressure losses along ductwork within the dwelling.

Faber Maunsell and Building Sciences Ltd are currently investigating the performance of natural ventilation systems (System 1 in ADF) in new dwellings.

Results to date show poor performance of some intermittent extract fans in each of the homes surveyed such that, in the worst case, only 10% of the designed flow is being achieved. Furthermore, more than half of the door undercuts are less than the 10 mm recommended in ADF to ensure adequate airflow between rooms when the internal doors are closed.

Indeed, in some cases, there is no gap between the floor finish and the bottom of the door.



We are therefore minded to make the following changes to the Part F requirement to:

- To make clearer in the Part F requirement the need for commissioning of natural and mechanical ventilation systems when installed in new and existing buildings and when carrying out relevant work on existing systems, to ensure that the ventilation systems operate as designed;
- To require air flow testing as part of the commissioning process of any mechanical ventilation device;
- To require a check list to be completed and given to the Building Control Body as evidence that the ventilation system has been commissioned (for new dwellings only);
- To require sufficient information about the ventilation system and its maintenance requirements to be given to the occupier so that the ventilation system can be operated to provide adequate air flow (for new dwellings only).

In addition:

- An installation and commissioning compliance guide has been prepared for work in new dwellings, which may also be used as good practice guidance for installations in existing dwellings, and is referenced in ADF.
- It provides guidance on installation and commissioning as well as including a check list for building control.



- ADF 2010 guidance now states that, for a standard 760 mm width door, the required undercut should be achieved by making an undercut of 10 mm above the floor finish if the floor finish is fitted, or by a 20 mm undercut above the floorboards, or other surface, if the finish has not been fitted. Furthermore, the size of the door undercuts is included in the check

Noise limits for domestic continuous mechanical ventilation

The number of new dwellings with continuous mechanical ventilation 2.50 systems is increasing according to ventilation industry stakeholders. This number may increase further as dwellings become more airtight due to, for example, the energy benefits afforded by heat recovery in MVHR units.

There is concern that the noise generated by continuously running mechanical ventilation systems, may cause occupants to turn the units to a lower setting or, indeed, turn them off, leading to under-ventilation and resultant health problems.

This may be even more likely to happen in airtight dwellings where there is less background noise to mask the ventilation system noise.

Other northern European countries such as France, where continuous mechanical ventilation systems in new dwellings are more commonplace, already set noise limits for domestic ventilation systems, while The Netherlands is considering setting limits for 2010.

It is therefore proposed to make the following change to the Part F requirement:



- Where continuously running ventilation systems are specified for new or existing dwellings, these shall have been type tested and shown to meet specified noise limits' for building control in the installation and commissioning compliance guide.
- In addition, guidance in a new Appendix in Approved Document F sets noise limits for continuously running domestic ventilation systems and provides details of how the ventilation systems should be type-tested to assess whether the noise limits have been met.
- Furthermore, following the guidance in the installation and commissioning compliance guide should reduce the incidence of noise from poorly installed systems.
- Making domestic ventilation systems a controlled service

It is proposed to make domestic ventilation systems a controlled service for ventilation as well as energy performance, so that all work on domestic ventilation systems will be building work that must meet Requirement F1.

However, only the provision (which includes replacement) or alteration of continuously running mechanical systems will be notifiable building work due to the detrimental impact that poor installation and commissioning of such systems can have on air flow capacity.

Main changes in the 2010 edition

This edition of Approved Document F: *Ventilation* replaces the 2006 edition.



The proposed main changes to the Building Regulations 2000 are:

- All ventilation systems (both natural and mechanical) shall be inspected and commissioned.
- For mechanical ventilation systems installed in new dwellings, air flow rates shall be measured on-site as part of the commissioning process. This shall apply to

Intermittently used extract fans and cooker hoods, as well as continuously running systems;

- Where continuously running ventilation systems for dwellings are specified, these shall have been type tested and shown to meet specified noise limits;
- The owner/occupier shall be given sufficient information about the ventilation system and its maintenance requirements so that the ventilation system can be operated to provide adequate air flow. This should apply to natural and mechanical systems in new dwellings;
- A check list shall be completed and given to the building control body as evidence that all the above have been done for new dwellings;
- Domestic ventilation systems will become a controlled service for ventilation as well as energy performance, which means that all work on domestic ventilation systems will be building work that must meet Requirement F1. However, only the provision (which includes replacement) or alteration of continuously running mechanical systems will be notifiable building work. Guidance has now been included for airtight homes. In all cases, this results in



greater ventilation provisions for dwellings with design air permeability tighter than or equal to 5 m³/(h.m²) at 50 Pa.

- The infiltration allowance for leakier homes is now the same for single-storey and multi-storey dwellings, resulting in increased ventilation provisions for single-storey dwellings up to four storeys above the ground.
- For passive stack ventilators (PSV), the stack diameter has been increased to 125 mm for all room types. Use of PSV in inner wet rooms has been clarified.
- The guidance for ventilation has been clarified when windows are replaced in an existing dwelling.
- The guidance for ventilation has been clarified when a kitchen or bathroom in an existing dwelling is refurbished.
- A new Appendix has been included which gives guidance on specifying and assessing noise levels from continuously running mechanical ventilation systems.
- A separate guidance document has been produced covering installation and commissioning of domestic ventilation systems (and the 2006 Appendices D and E have therefore been removed).

In general terms, the requirement may be achieved by providing a ventilation system which:

- Extracts, before it is generally widespread, water vapour from areas where it is produced in significant quantities (e.g. kitchens, *utility rooms* and *bathrooms*);



- Extracts, before they are generally widespread, pollutants which are a hazard to health from areas where they are produced in significant quantities (e.g. rooms containing processes or activities which generate harmful contaminants);
- Rapidly dilutes, when necessary, pollutants and water vapour produced in *habitable rooms*, *occupiable rooms* and *sanitary accommodation*;
- Makes available over long periods a minimum supply of outdoor air for occupants and to disperse, where necessary, residual pollutants and water vapour. Such ventilation should minimise draughts and, where necessary, should be reasonably secure and provide protection against rain penetration;
- Designed, installed and commissioned to perform in a way which is not detrimental to the health of the people in the building; and
- Installed to facilitate maintenance where necessary.

The guidance in this Approved Document has not been formulated to deal with the products of tobacco smoking.

Ventilation systems in buildings result in energy being used to heat fresh air taken in from outside and, in mechanical *ventilation* systems, to move air into, out of and/or around the building. Energy efficiency is dealt with under Part L of the Building Regulations but consideration should be given to mitigation of *ventilation* energy use, where applicable, by employing heat recovery devices, efficient types of fan motor and/or energy-saving control devices in the *ventilation* system.



The purpose of ventilation

- Is simply the removal of “stale” indoor air from a building and its replacement with “fresh” outside air. It is assumed within the Approved Document that the outside air is of reasonable quality.

It is required for one or more of the following purposes:

- Provision of outside air for breathing;
- Dilution and removal of airborne pollutants, including odours;
- Control of excess humidity (arising from water vapour in the indoor air);
- Provision of air for fuel-burning appliances (which is covered under Part J of the Building Regulations).

Ventilation provides a means to control thermal comfort but this is not controlled under the Building Regulations, although Part L addresses minimising energy use due to summer overheating.

The airborne pollutants and water vapour mentioned in above include those that are released from materials and products used in the construction, decoration and furnishing of a building, and as a result of the activities of the building’s occupants.

The pollutant(s) of most importance will vary between building types (e.g. dwelling, office, factory), building uses (e.g. industrial process, shop, commercial kitchen), and even from room to room within a building (e.g. kitchen, shower room, conference room, photocopier room). Common pollutants in a dwelling are moisture and combustion



products from unflued appliances (e.g. gas, oil or solid fuel cookers) and chemical emissions from construction and consumer products. In an office building, body odour is often the key pollutant, but there are a number of other pollutant sources including the building itself, furnishings, printers and photocopiers

Part L: All new buildings are expected to better the target value to some degree. Research suggests that the most airtight domestic and non-domestic buildings, using normal (but carefully executed) construction methods, can have an *air permeability* down to around 3–4 m³/(h.m²) of envelope area at 50 Pascal (Pa) pressure difference. Some examples will be tighter than this.

The ventilation provisions recommended in this Approved Document have been specified to cope with two design standards of air permeability: (a) leakier than 5 m³/(h.m²) at 50 Pa; and (b) tighter than or equal to 5 m³/(h.m²) at 50 Pa.