

New edition of Approved Document F

Amendments to strengthen the requirements of the Building Regulations and Approved Inspectors Regulations for the ventilation of buildings

Introduction

A1 The changes to the 2010 Part F requirements and guidance are aimed at ensuring that indoor air quality is not adversely affected by buildings – particularly dwellings – becoming more airtight to meet higher Part L energy efficiency standards. If natural and mechanical ventilation systems are not properly designed, installed, commissioned and operated, then ventilation may be inadequate, leading to excessive levels of moisture and pollutants, and an increased risk of condensation, mould growth and ill-health. In airtight buildings, infiltration through gaps and cracks may not provide sufficient ventilation if the purpose-provided ventilation under-performs or fails. So trickle ventilators, extract fans and ductwork should be correctly sized and installed; and occupants should not tape over draughty trickle ventilators, switch off noisy fans, or allow filters to become blocked.

Changes to Part F requirements and guidance

A2 The changes that come into effect on 1 October 2010 are concerned with:

- making provision for more background (trickle) ventilation in intermittent extract and passive stack ventilation systems of dwellings – to compensate for reduced air infiltration through gaps and cracks¹

- ensuring that mechanical ventilation systems – which are likely to become more commonplace as we approach zero carbon standards – are properly designed, installed and commissioned

- providing information so that ventilation systems can be properly operated and maintained by occupants.

A3 The specific changes to the Building Regulations are:

- a new requirement F1(2) to commission mechanical ventilation systems in dwellings and other buildings

- an addition to regulation 44 (1) adding ventilation systems to the types of building services for which local authorities should be given a notice confirming that commissioning has been carried out

- a new regulation 42 to measure air flow rates for mechanical ventilation systems in new dwellings, and to give the local authority a notice of the results

- a new regulation 39 to provide owners of dwellings and other buildings with information on how to operate and maintain their ventilation system.

These regulations also apply where the building control body is an Approved Inspector. (see regulation 20 of the Building (Approved Inspectors etc.) Regulations)

¹ The default equivalent area of background ventilators has been set assuming that the air permeability (leakiness) will not be greater than 5 m³/(h.m²) at 50 Pa. The smaller background ventilators specified in ADF 2006 may still be used, but only if the dwelling has been designed to have an air permeability greater than 5 m³/(h.m²) at 50 Pa, and this is confirmed by air pressure tests on samples of dwelling types as specified in Approved Document L.

A4 The changes to the approved guidance for dwellings include:

- guidance in Sections 2 and 3 of a new *Domestic ventilation compliance guide* on installing and inspecting the four ventilation system types (systems 1 to 4) described in detail in Approved Document F (ADF)

- new tables in ADF specifying the total equivalent area of background ventilators for intermittent extract (system 1) and passive stack (system 2) ventilation systems in dwellings

- approved procedures in Sections 2 and 3 of the *Domestic ventilation compliance guide* for measuring air flow produced by mechanical ventilation systems in new dwellings (including extractor fans and cooker hoods)

- approved procedures in Section 3 of the *Domestic ventilation compliance guide* for commissioning continuous mechanical extract (system 3) and continuous mechanical supply and extract with heat recovery (system 4) ventilation systems in dwellings

- guidance in Section 4 of the *Domestic ventilation compliance guide* on the documentation that should be handed over to the end user

- a three-part *Inspection checklist and air flow measurement test sheet* in Section 5 of the *Domestic ventilation compliance guide* for recording system details, inspection details, trickle ventilator equivalent areas, air flow measurements, and commissioning details. The persons responsible for the work should sign the sheet, identifying their company and adding if relevant their competent person scheme registration details.

Installation of ventilation systems

A5 ADF recommends that ventilation systems should be installed in new and existing dwellings in accordance with the guidance in the *Domestic ventilation compliance guide*. The guidance in Appendices D and E of the 2006 edition of ADF – on installing passive stack ventilators and fans in dwellings – can now be found in the *Domestic ventilation compliance guide* along with other guidance.

A6 The system installer should complete the installation checklist and inspection sheet in Section 5, recording the equivalent area of any background ventilators so that the total ventilator area can be checked for compliance with Tables 5.2a and 5.2b of ADF. (All trickle ventilators should now be marked with their equivalent area.)

A7 Installation guidance for buildings other than dwellings can be found in the references listed in Table 6.3 of ADF.

Air flow rate testing and commissioning of ventilation systems

A8 The statutory requirement is for mechanical ventilation systems in dwellings and other buildings to be commissioned (where they can be tested and adjusted) to provide adequate ventilation in accordance with a procedure approved by the Secretary of State. A commissioning notice confirming that commissioning has been carried out must be given to the building control body not later than five days after the work has been completed where a person has submitted a building notice or full plans, or in other cases not later than 30 days after the completion of work.

A9 There is also a statutory requirement for air flow rates of mechanical ventilation systems in new dwellings to be measured in accordance with an approved procedure, and for a notice to be given to the building control body not later than five days after the final test is carried out.

A10 For dwellings, the approved procedures for measuring air flow rates and for commissioning mechanical ventilation systems are in Sections 2 and 3 of the *Domestic ventilation compliance guide*. The person responsible for testing and commissioning should complete the air flow measurement test and commissioning sheet in Section 5, an electronic copy of which can be downloaded from www.planningportal.gov.uk. This is the approved manner for recording the results, and should form part of the notice given to the building control body.

A11 For commissioning of non-domestic ventilation systems, the approved commissioning procedure is CIBSE Code M.

A12 Commissioning of mechanical ventilation systems should ensure that they provide reasonable energy efficiency under Part L as well as adequate ventilation under Part F. It is permissible for the notice of commissioning given to the building control body to cover both.

Provision of information

A13 There is a statutory requirement for sufficient information about the ventilation system and its maintenance requirements to be given to owners so that the ventilation system can be operated to provide adequate air flow.

A14 For new and existing dwellings, Section 4 of the *Domestic ventilation compliance guide* lists the documents that it is recommended should be given to the dwelling owner at installation handover.

A15 The inspection checklist and air flow measurement test and commissioning sheet in Section 5 should form part of the information pack. An electronic version of the whole of Section 5 can be downloaded from www.planningportal.gov.uk (Part 3 of Section 5, covering air flow measurement and commissioning, is part of the notice given to the building control body - see A10.)

A16 For new and existing buildings other than dwellings, a way of showing compliance with the requirement for provision of information is to follow the guidance in Approved Documents L2A and L2B, which refer to the CIBSE TM 31 *Building log book toolkit*, 2006.

New edition of Approved Document J

B1 The Part J guidance on ventilation has been revised to ensure that combustion appliances can continue to function safely in more airtight homes. The changes also remove technical disincentives to the wider use of Biomass heating systems. Part J has been amended to introduce a new requirement for carbon monoxide alarms to be fitted where solid fuel appliances are installed. The main changes to the Approved Document are set out below. A number of references, particularly to standards, have been updated throughout the Approved Document. The Approved Document also now draws attention to the requirements of the Clean Air Act 1993.

Section 1

B2 There is new guidance for access for visual inspection of concealed flues to ensure that they can be properly inspected, particularly at any joints in the flue, both when an appliance is first commissioned and subsequently serviced.

Section 2

B3 Guidance for flue outlet clearances relative to adjacent pitched roofs has been clarified in Diagram 17.

B4 To take account of the availability of modern appliances, the guidance on the provision of hearths and wall clearances for solid fuel appliances has been made more flexible.

B5 There is a new requirement for the provision of carbon monoxide alarms where new or replacement solid fuel appliances are installed. This affects both new and existing dwellings.

Sections 2, 3 & 4

B6 The guidance in Table 1 has been amended to increase the permanent ventilation openings for open flued appliances in airtight houses (with a design air permeability less than or equal to 5 m³/h/m² @ 50Pa) counteract the decrease in adventitious ventilation relative to older houses. Appendix F of the Approved Document gives advice on assessing the air permeability of older houses in relation to this guidance.

Section 4

B7 Section 4 now explicitly includes liquid biofuel and blends on mineral oil and liquid biofuel within the scope of combustion installations designed to burn oil.

Section 5

B8 The guidance on identifying where secondary containment for oil tanks is necessary has been expanded to include locations in inner protection zone as shown on the Environment Agency's groundwater sources map.

Appendix G European chimney designations

B9 Appendix G is new and provides an explanation of the European designation system for certain flue and chimney products.

Changes to the energy efficiency requirements

Introduction

C1 The effects of the 2010 changes are to strengthen the energy performance standards for new buildings and when building work is carried out to existing buildings and to help builders and building control bodies establish compliance through the introduction of additional calculations, information and testing.

C2 The provisions for conservation of fuel and power are set out in:

- requirements relating to thermal elements (regulations 23);
- carbon dioxide (CO₂) emission rates (regulation 26);
- consequential improvements (regulation 28);
- energy performance certificates (regulation 29); and
- technical requirements in Part L of Schedule 1.

The above are collectively defined in regulation 2 as the ***energy efficiency requirements***.

C3 For new buildings the five criteria for new build compliance introduced in 2006 is retained requiring builders to demonstrate that:

- the CO₂ emission rate target is achieved;
- the design does not fall outside limits of design flexibility;
- the building does not suffer from excessive solar gains;
- the building as constructed delivers the calculated CO₂ performance; and
- information is provided to enable the building to be operated efficiently.

CO₂ Emission Rate Calculations

C4 For new buildings a new requirement is introduced (regulation 27(2)), where regulation 26 applies, for CO₂ emission rate calculations to be carried out and given to the Building Control Body along with a list of specifications to which the building is to be constructed not later than a day before the work starts. This is in addition to the CO₂ emission rate calculation required to be submitted not later than 5 days after completion of the work (regulation 27(3)). Although it is possible at design stage that there may be some identical calculations on a development, a CO₂ emission rate calculation with supporting information is required to be given to the Building Control Body for each building before commencement of work.

C5 Guidance for presenting the evidence that demonstrates compliance with the energy efficiency requirements and highlighting key features that are critical in achieving the annual CO₂ emission rate target can be found at Appendix A to Approved Documents ADL1A and ADL2A. It is anticipated that approved software tools would produce standardised formats for presenting the list of specifications and highlighting key features.

CO2 Emission Rate Targets

C6 For new homes the Target Emission Rate is now calculated using SAP2009 and must not exceed the target set by reference to a 2002 standard notional dwelling of the same size and shape as the actual dwelling but with an additional improvement of 25% relative to 2006 standards.

C7 The notional dwelling now also includes a **party wall heat loss** of zero meaning that the targeted improvement of 25% is in addition to treating party walls between connected homes against heat loss. In the actual dwelling secondary heating is only counted as part of the annual CO₂ emission rate of the completed dwelling when actually provided for and credit is allowed wherever low energy lighting is installed. (see paragraphs 5.3 – 5.8 of Approved Document L1A)

C8 For new non-domestic buildings, the Target Emission Rate is calculated using 2010 versions of the Simplified Building Energy Model (SBEM) or other approved software tools and must not exceed the target set by reference to a notional building of the same size and shape as the actual building, constructed to a 2010 specification with no improvement factor. Developers have the freedom to vary this concurrent specification provided the Target Emission Rate is achieved or bettered. This concurrent specification takes into account the difficulties/opportunities of improving energy efficiency in different types of building based on relative cost effectiveness of making improvements to typical components. This means some buildings will deliver more than 25% relative to 2006 standards, some less, but overall the improvements are optimised to deliver 25% when applied across the national new non-domestic build mix;

C9 SAP 2009 is available at: <http://www.bre.co.uk/sap2009/page.jsp?id=1642> and SBEM 2010 (SBEM v4) is available at: <http://www.2010ncm.bre.co.uk>

Limits of Design Flexibility

C10 For all new buildings there has been some strengthening of the limits of design flexibility to ensure minimum standards of energy efficiency are achieved in all cases. Fabric insulation backstops are set out in the Part L Approved Documents and the backstops for fixed building services can be found in the supporting Building Service Compliance Guides.

Limiting the Effects of Solar Gain

C11 For new dwellings, Approved Document L1A cites the procedure set out in SAP2009 Appendix P with reasonable provision for limiting heat gains being achieved where the Appendix P procedure indicates that the dwelling will not have a high risk of experiencing high Internal temperatures.

C12 For new non-domestic buildings a revised procedure is provided for demonstrating that reasonable provision has been made to limit the effects of solar gain in summer by comparison with a reference glazing system.

Thermal Bridging

C13 There is revised guidance on demonstrating reasonable provision for avoiding thermal bridging at construction joints including the option of adopting a quality

assured accredited construction details scheme approach.

C14 At the time of publication of this circular letter no accredited construction details schemes have been approved by the Secretary of State. Until such time that accredited construction details schemes have been approved, the calculated value of linear transmittance may be used in SAP without any performance penalty being added where this has been calculated by a suitably experienced and qualified person and the builder has provided information about the way the detail is to be constructed to the Building Control Body.

C15 Upon approval of accredited construction details schemes a further circular letter will be issued to reinstate the margins to be applied to the calculation of thermal transmittance as set out at paragraph 5.12(b) to Approved Document L1A and paragraph 5.7(b) to Approved Document L2A.

Air pressure testing

C16 The sampling rate for domestic developments has been increased. On each development tests should be carried out on three units of each **dwelling type** or 50% on all instances of that **dwelling type**, whichever is less. Also, blocks of flats should be treated as separate developments irrespective of the number of blocks on site.

C17 Where a dwelling has been pressure tested this value is used in the completion stage CO₂ emission rate calculation. Where a dwelling has not been pressure tested, the value used in the completion stage CO₂ emission rate calculation is the average test result obtained from other dwellings of the same **dwelling type** on the development increased by a margin of + 2 m³/(h.m²) @ 50Pa. For small developments where the builder has opted to avoid pressure testing altogether the value used in the completion stage CO₂ emission rate calculation is 15 m³/(h.m²) @ 50Pa.

C18 To provide a better test of the airtightness of the building envelope, trickle vents should be temporarily sealed rather than just closed when testing. There are now separate ATTMA (Air Tightness Testing and Measuring Association) Guides for domestic and non-domestic situations. The criteria for non-BINDT (British Institute of Non-Destructive Testing) registered testers has changed and they are now required to demonstrate that their test equipment has been calibrated within the previous 12 months using a UKAS accredited facility.

Commissioning

C19 The Part L requirement and guidance on commissioning reflects changes introduced to the Regulations in 2007. Part L1(b)(iii) makes it clear that commissioning means testing and adjusting as necessary to ensure that the fixed building services use no more fuel and power than is reasonable in the circumstances. Regulation 44(2) makes it clear that the requirement on commissioning does not apply where testing and adjustment is not possible or where it would not affect the energy efficiency of the fixed building service.

C20 The Approved Document guidance recommends that it would be useful to prepare a commissioning plan, identifying the systems that need to be tested and the tests that will be carried out and provide this with the design stage calculation so that it can be checked that the commissioning is being done as the work proceeds.

C21 Where commissioning is necessary the procedures set out in the *Domestic Building Services Compliance Guide*, the *Non-Domestic Building Services Compliance Guide* and the *Domestic Ventilation Compliance Guide* should be followed.

C22 The notice of completion of commissioning should be given to the Building Control Body within five days of the completion of the commissioning work. In other cases, for example where work is carried out by a person registered with a competent person scheme (it must be given within 30 days).

Providing Information

C23 The person carrying out the building work shall not later than five days after the work has been completed provide to the owner sufficient information so that the building can be operated and maintained efficiently (now set out in Regulation 40 rather than in the Part L1(c) requirement).

Conservatories

C24 Building control bodies will wish to note that the exemption from the energy efficiency requirements for conservatories and porches has been clarified. This means that a conservatory will be exempt from the energy efficiency requirements only where:

- it is at ground level;
- it does not exceed 30 m² in floor area;
- the walls, windows and doors separating the conservatory or porch from the building to which it is attached have not been removed, or, if removed, have been replaced by a wall window or door which meets the current requirements for energy efficiency for walls, windows and doors; **and**
- the fixed heating system of the building to which the conservatory or porch is attached has not been extended into the conservatory or porch.

C25 Where a conservatory or porch does not meet **all** of the above conditions it is not exempt and Approved Documents L1B and L2B give guidance on what would be reasonable in meeting the energy efficiency provisions from non-exempt conservatories and porches. Building Control Bodies will want to note that the definition of conservatory in terms of percentage translucent material as set out in previous editions of the Approved Documents no longer applies.

Modular and Portable Buildings

C26 As in 2006 and previously, special consideration apply for modular and portable buildings.

C27 For the purposes of the Building Regulations, modular and portable buildings with a planned life of more than two years at a given location, should meet the full five criteria set out in the 2010 Approved requirements. However, if more than 70% of the external envelope of the building is to be created from sub-assemblies manufactured prior to 1 October, the 2010 Target Emission Rate should be adjusted as set out in Table 3 of ADL2A.

C28 When modular and portable buildings with a planned life of more than two years are to be sited at more than one location (often resulting from distress purchase or hire) the Target Emission Rate/Building Emission Rate should be carried out at the time of construction and can be based on a standard generic configuration. This calculation should then be used as evidence whenever the building is relocated. The supplier should be asked to provide appropriate documentation.

C29 Electric heating will be the norm in most modular and portable buildings and this should be compensated for in the Target Emission Rate/Building Emission Rate calculation. There is detailed advice on this in Approved Document L2A.

Shell and Core

C30 There is revised guidance on shell and core developments and first fit out work.

C31 For a shell and core scheme being offered to market by a developer, the CO₂ emission rate calculation before commencement of work needs to demonstrate compliance assuming efficiencies for the fit out works. This ensures that requirements are achievable when the building is subsequently fitted out.

Swimming Pool Basins

C32 There is a completely new requirement for swimming pool basins in new or existing buildings. Reasonable provision in most circumstances would be to limit the heat loss by achieving a U-value no less than 0.25 W/m².K as calculated according to BS EN 13370.

Windows and other controlled fittings

C33 The guidance on new or replacement windows in existing dwellings or other buildings has been expanded. The minimum performance standards for windows and doors, as measured by U-values, have been raised. The Window Energy Rating (WER) can be used as an alternative to the U-value. Insulated cavity closers should be fitted where appropriate.

C34 Where windows, roof windows, rooflights or glazed doors have to be to a bespoke design (e.g. to match existing retained windows, or in a building in a conservation area), a Window Energy Rating or composite U-value may not be available, and it may be unreasonable to expect the necessary calculations to be done for a one-off unit. Only in such exceptional circumstances (and having agreed it with the relevant Building Control Body and/or Competent Person) may the alternative standard of a centre-pane U-value be accepted.

Renovation of Thermal Elements

C35 Thermal elements are walls, roofs or floors that separate a conditioned (heated) space from the external environment. The guidance on the renovation of thermal elements in the Approved Documents has been clarified and expanded in relation

what constitutes 'renovation', and the extent of work on individual thermal elements that are captured by the requirement.

C36 Schedule 4 of the Regulations has been amended with the effects that where the installation of insulation in a roof or loft space is the only work being carried out there is no requirement to notify building control.

The Approved Documents

C37 The layout of the four Approved Documents L has been changed quite extensively from the 2006 versions to improve their general accessibility and to point the reader to places where they can get further help and information.

C38 There is amended guidance given for historic and traditional buildings which may have an exemption from the energy efficiency requirements or where special considerations apply.

Building Services Compliance Guides

C39 These guides replace the previous Domestic Heating Compliance Guide and Non-Domestic Heating, Cooling and Ventilation Compliance Guides and have been expanded to cover a wider range of fixed building services. They include some guidance that previously appeared in the Approved Documents. They provide guidance for persons installing fixed building services in new and existing buildings to help them comply with building regulations. They cover work on both new systems and replacement systems, identifying the differing standards where these exist.

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