

LEGISLATION & REGULATIONS

APPROVED DOCUMENTS F (ADF) AND L (ADL) OF THE BUILDING REGULATIONS

Approved Documents F (ADF) and L (ADL) of the Building Regulations were issued in October 2010. They place much greater emphasis on effective design, installation and operation of ventilation systems. The objective is to maximise carbon reduction through correctly specified and designed systems, competent installation minimising losses of the systems, verified performance once installed and correct operation by the homeowner.

ADF OVERVIEW

This section explains how to achieve compliance, looking at the three key areas in detail: Specification and Design, Installation and Commissioning, Operation and Maintenance. ADF, Means of Ventilation is the document which addresses the performance requirements of different ventilation systems. Factors such as airflow rates, noise and occupier's operation are all covered here. The new edition has a few top-level changes which may mean something to you (we will cover them in more detail in each section later on) but as an overview they are as follows:

VENTILATION RATES

For the first time the ventilation rate of a given property is calculated dependant on the designed infiltration rate. Basically, how much it leaks when the wind blows (anyone who has lived in a drafty house will understand the importance that this has!). There are now two levels of ventilation based on how much they leak air. This is measured in how much air leaks from the building by its surface area and the units are m³h of air per m² of building area (m³h/m²).

INSTALLATION AND COMMISSIONING

There is now some guidance on good installation practice and a commissioning guide set out in a supporting document to ADF known as the Domestic Ventilation Compliance Guide. This has been designed to ensure that ventilation not only delivers the required airflow, but also does it efficiently and quietly. The document also links in with the competent persons schemes and training programmes run by the industry. See page 13 for more information on our BPEC training course which is designed to teach good installation practices.

ADL OVERVIEW

ADL, the document covering fuel and power is where the energy efficiency information on ventilation is covered. Putting it simply the new document has improved the energy efficiency targets for buildings by 25%. This affects ventilation equipment as they are part of the SAP calculation and there are now new Target Emission Rate's (TER's) set to deliver the 25% improvement over the previous regulations. This is now in line with the Code for Sustainable Homes Level Three. There is also an opportunity to save energy through ventilation by using SAP Appendix Q. This is a method by which energy efficient ventilation systems can be selected and the energy benefit be added back into the SAP calculation.

WHAT DOES THIS MEAN FOR VENTILATION?

Ventilation uses energy in two ways. Firstly, mechanical systems use electricity to power the motors and secondly there is heat loss as air is exhausted from the building which has been heated. This is now dealt with by a minimum energy efficiency level for all ventilation systems being set in a supporting document called The Domestic Building Services Compliance Guide. There are now for the first-time new build and refurbishment minimums in both the amount of electricity a motor can use (minimum specific fan power (SFP) and a minimum energy efficiency of heat exchangers in systems that can recover the heat.

We recommend that best practice is followed when designing and installing a system, as the product performance is affected by both areas. We can offer support with both elements, please see pages 12 and 13 for further information on how we can help.

VENTILATION

There are four systems covered in the building regulations and these are as follows:

- *System 1*
 - Intermittent fans and background ventilation
- *System 2*
 - Passive stack
- *System 3*
 - Continuous Mechanical Extract Ventilation (MEV and dMEV).
- *System 4*
 - Continuous mechanical supply and extract ventilation with heat recovery (MVHR).

SUMMARY

- Airflow performance
- Minimum energy efficiency limits
- Good installation
- Use by occupiers

LEGISLATION

APPROVED DOCUMENT F 2010 - MEANS OF VENTILATION

The purpose of the regulation is to ensure adequate means of ventilation is provided for people in the building. According to the document, ventilation can be defined as 'the removal of stale air from a building and replacement with fresh outdoor air.'

By providing outside air to breathe, ventilation assists in the dilution and removal of pollutants as well as a reduction in humidity/condensation, which combined create a more pleasant environment and relief for asthma and allergy sufferers.

In short, ventilation provides fresh, clean air reducing the health risks to people and protecting the building fabric from damage.

Approved Document F (ADF) is a performance based whole dwelling solution stating not only what should be done, but also guidance on how this can be achieved.

The pollutants in today's modern dwellings have led to these changes, with the types of pollutants and the acceptable levels now detailed in the ADF 2010.

- Nitrogen Dioxide (NO₂)
- Carbon Monoxide (CO)
- Total Volatile Organic Compounds (TVOC)
- Bio-effluents (body odours)

Within ADF 2010 Ventilation requirements for new build properties now reference the whole dwelling based on an analysis of floor area, number of bedrooms and occupants. There are four systems covered in ADF

2010 including Intermittent Extract Fans, Passive Stack, Continuous Mechanical Extract Ventilation (MEV) and Mechanical Ventilation with Heat Recovery (MVHR).

On top of the changes to the main document a new guide has also been published called the 'Domestic Ventilation Compliance Guide'. This covers installation practices as well as sign off and commissioning - now a requirement.

WHAT WERE THE KEY ADF CHANGES FOR OCTOBER 2010?

Efficiency regulations require buildings to be 'better sealed' and 'more airtight'. In ADF 2010 there are now two ventilation rates based on the designed infiltration rate of your building.

There is one rate for properties with infiltration rates over 5m³/h/m² (leakier properties) and a higher ventilation rate for properties below 5m³/h/m² (tighter properties).

These changes mean that for the first-time infiltration rates need to be known before ventilation can be sized. The practical outcome of this means that in airtight properties, the following applies:

- Background ventilation with intermittent fans are up to 50% bigger
- MVHR rates are increased in airtight dwellings

At the same time, there are also some benefits for designers. Background ventilators are not now required in properties leakier than 5m³/h/m².

Guidance has been given for ventilation of basements in houses and trickle ventilation for replacement windows.

Compliance with ADF requires installed performance to meet the ventilation rates quoted in the document. All systems must now be signed off by a competent person.

WHY ARE THESE CHANGES BEING MADE?

The Government's commitment to reduce energy consumption and carbon emissions requires buildings to be more airtight and more energy efficient. Air tightness is now measurable and defined in ADL of the Building Regulations. The developments in ADF reflect these changes, accounting for the requirement to ventilate efficiently for human comfort and health, whilst using proven technology such as Heat Recovery ventilation and energy saving Lo-Carbon motors to achieve this.

Vent-Axia has been active for over 15 years in supplying heat recovery solutions to countries around the world, whose building regulations already demand the most effective, sustainable and energy efficient of ventilation solutions. At the same time, the changes being made reflect the most recent research, linking air pollutants and condensation to effects on health (particularly asthma) and damage to the building fabric (mould), with guidance on ventilation systems and required flow rates taking this into account.

NOISE

With the growth in the use of brownfield sites for residential development noise ingress from traffic, industry and airports has become an important aspect for any building designer to consider.

With increasing airtightness, the acoustic properties also improve leading to a reduction of external noise entering our dwellings. However, this makes any noise generated inside the property even more noticeable, so in ADF 2010, a maximum noise level of 35dB(A) has been set for the trickle speed on continuous ventilation systems.

APPROVED DOCUMENT L 2010 – CONSERVATION OF FUEL AND POWER

At the same time as the changes to ADF further changes to ADL Conservation of Fuel and Power are also being made.

There are additional documents published to support these changes including the Non- Residential and Residential Building Services Compliance guides and the Domestic Ventilation Compliance Guide. These 2nd tier documents form part of the Building Regulations.

These documents set new minimum performance levels for ventilation efficiencies and reducing the consumption of the systems.

BUILDING REGULATIONS 2010

The revised Building Regulations 2010 have brought some significant changes to the ventilation sector in a bid to improve both indoor air quality and energy efficiency.

ADL – New inclusions

- New TERs have been set to deliver a 25% reduction over the previous regulations, in line with the Code for Sustainable Homes level 3 and the Domestic Building Services Compliance Guide – Specific Fan Power Requirements.
- Non-Domestic Building Services Compliance Guide - Revised specific power requirements. New minimum heat recovery efficiency minimums to EN308 test standard introduced.
- A minimum energy efficiency level for all ventilation systems has been set. New build and refurbishment applications for intermittent fans must have a specific fan power (SFP) of less than 0.5 W/l/s. Vent-Axia is the only ventilation company offering a full range of Lo-Carbon fans for all applications that comply with this requirement.
- Summer overheating is becoming a problem in many well insulated modern buildings. ADL suggests use of MVHR with a summer bypass to improve ventilation effectiveness: Criterion 3, 4.25

ADF 2010 - New inclusions - Ventilation based on infiltration

- To further lower dwelling emission levels, homes need to be increasingly air tight, therefore ADF publishes guidelines for airtight properties below 5m³/h/m² infiltration rates at 50Pa. For Intermittent System 1 and Passive Stack System 2 approaches, in airtight dwellings the guidance increases background ventilation rates by up to 50%.
- The ventilation rate of a given property is calculated dependant on the designed infiltration rates. This eliminates the need for background ventilators in habitable rooms when specifying MEV or dMEV systems for applications in dwellings at 5m³/h/m² or above. So, dMEV systems, like the Lo- Carbon Response from Vent-Axia, would prove a simple and scalable solution resulting in DER reductions.

DOMESTIC VENTILATION COMPLIANCE GUIDE

There is now some guidance on good installation practice and a commissioning guide. This has been designed to ensure that ventilation not only delivers the required airflow, but also does it efficiently and quietly. This has been designed to link in with competent persons schemes developed for ventilation.

Vent-Axia – Lo-Carbon range

- Historically, low energy DC or EC motors in residential extract fans have been available at a high premium. However, the new Lo-Carbon range from Vent-Axia is available with only a small increase in cost making them a realistic alternative; energy efficient and affordable.

Our investment in UK manufacturing has enabled us to develop these ranges of improved extract fans. We have also introduced a new range of Lo-Carbon decentralised ventilation systems including:

- Safety Extra Low Voltage (SELV) version of the innovative Centre; a discreet, near silent dMEV solution.
- SELV version of the versatile, multipurpose fan, the Quadra.

SCOTTISH BUILDING STANDARDS - DOMESTIC VENTILATION

The Technical Handbook Section 3 came into force in October 2010.

The new regulations have been expanded to include 4 intermittent and continuous systems:

- Mechanical Extract (Intermittent Fans) with Specific Fan Power no more than 0.5 W/l/s. Background ventilators are required based on the infiltration rate.
- Natural Ventilation (Passive Stack) with duct diameter sizes ranging from 80mm (WC) to 125mm (Kitchen). Background ventilators are required based on the infiltration rate.
- Mechanical Ventilation – (Continually Operating Extract System). Extract rates should be equivalent or greater than 0.5 ACH with boost facility. Specific Fan Power should be no greater than 0.7W/l/s. Background ventilators are required based on the infiltration rate.
- Mechanical Ventilation – continuous operating balanced supply and extract with or without Heat Recovery. (MVHR systems). Extract rates should be equivalent or greater than 0.5 ACH with boost facility of 25% - 50%. SFP no greater than 1.5 W/l/s and thermal efficiency no less than 70%. This is the only system that does not require trickle ventilators.