



**Ensuring adequate ventilation to naturally-ventilated dwellings with high levels of as-built air tightness**

**Purpose**

BCA technical guidance notes are for the benefit of its members and the construction industry, to provide information, promote good practice and encourage consistency of interpretation for the benefit of our clients. They are advisory in nature, and in all cases the responsibility for determining compliance with the Building Regulations remains with the building control body concerned.

This guidance note is based upon information available at the time of issue and may be subject to change. The Approved Documents should be consulted for full details in any particular case.

**Introduction**

Changes to Approved Document L in 2006 have led to dwellings becoming substantially more airtight than they were in the past. Whilst increased airtightness is beneficial for improving energy efficiency, there are consequences for ventilation: with fewer minor gaps in the fabric, there will be less unintended ventilation to supplement the background ventilation provided.

Adequate ventilation is necessary to ensure that moisture and pollutants within the dwelling are managed and indoor air quality is satisfactory. This is particularly important since research<sup>1</sup> has established a link between indoor air quality and the health of occupants, with effects including a range of serious conditions such as allergic and asthma symptoms, lung cancer, chronic obstructive pulmonary disease, airborne respiratory infections and cardiovascular disease.

<sup>1</sup>Mechanical ventilation with heat recovery in new homes – interim report, Zero Carbon Hub, January 2012

**Key Issues**

Where ventilation system 1 (background ventilators and intermittent extract fans) and system 2 (passive stack ventilation) are used, Approved Document F 2010 recommends that an increased total ventilator area is provided:

- where the design air permeability is tighter than 5m<sup>3</sup>/(h.m<sup>2</sup>) at 50 Pa
- where the as-built air permeability is tighter than 3m<sup>3</sup>/(h.m<sup>2</sup>) at 50 Pa
- (see Tables 5.2a and 5.2b and clause 5.10 in AD F).

As builders have become more used to delivering airtight dwellings, an increasing proportion of homes are over-achieving in terms of airtightness, which gives rise to a key question:

**What action should be taken when a dwelling has been designed with an air permeability leakier than 5m<sup>3</sup>/(h.m<sup>2</sup>) and when tested the as-built air permeability is tighter than 3m<sup>3</sup>/(h.m<sup>2</sup>)?**

In these situations the dwelling will have only the lower total equivalent ventilator area where the increased total equivalent ventilator area should have been provided.

**Guidance**

Given the established links between airtightness, indoor air quality and occupant health, it is important that the issues are not ignored. The following table provides guidance for this situation:

Designed air permeability [m <sup>3</sup> /(h.m <sup>2</sup> )]	As-built air permeability [m <sup>3</sup> /(h.m <sup>2</sup> )]	Action (for AD F) (see note 3)
Leakier than 5	Leakier than 5	No action needed
	Between 5 and 3	No, but see note 1
	Tighter than 3	Yes, see note 2
Tighter than 5 (increased total ventilator provided)	Any figure	No action needed

## Notes

1. Good practice would be for the BCB to discuss with the applicant the potential risks to IAQ and health of over achieving in terms of airtightness. This should help to reduce issues of under ventilation on future dwellings.
2. There is a risk that the dwelling will not be ventilated adequately and so additional background ventilation should be provided by means of larger or additional background ventilators (or installing mechanical ventilation).  
It is not advisable for remedial action involving creating additional gaps in the building fabric. Such measures would be unlikely to distribute ventilation throughout the dwelling sufficiently evenly.
3. For AD L, the as-built SAP should take account of the as-built air permeability.