

Feature

Air tightness: building control questions answered

Following a series of dedicated seminars for Building Control officers, Tom Gregory, head of Chiltern Dynamics' Energy Services Department, answers their most frequently asked questions about air tightness.

What is the pass rate?

According to Approved Document L, a 'reasonable level' of air permeability for tested buildings is $10\text{m}^3/(\text{h}\cdot\text{m}^2)$ at a pressure difference of 50Pa, but the actual requirement will often be significantly lower.

If buildings are to achieve their Target Emission Rate (TER), based on SAP or SBEM calculations, a score of 10 is often simply not good enough. A 10 is quite leaky, the equivalent of a 20p piece size hole for every square metre of the 'envelope' area. The building envelope is defined as the total area of the internal face of ground floor, external walls and structural ceiling.

Commonly, factors which have an impact on the air leakage rate – such as insulation, glazing and heating systems – have been decided before the TER is agreed, so there is no room to manoeuvre on the Design Air Permeability target, which might have to be 6, 5 or even 3 if, eg *Code for Sustainable Homes*, social housing or other client specification requirements are to be met.

Which projects need to be tested?

- New dwellings
- New buildings other than dwellings
- Extensions to buildings other than dwellings (greater than 100m^2 floor area and a 25% on the existing building floor area).

There are some exceptions, but these only apply if the TER can be calculated based on an assumed value of a rather poor 15. In this case, other aspects that impact on energy performance will have to be sufficiently improved to balance this out.

Small dwelling developments (1 or 2 units) and small new buildings other than dwellings (less than 500m^2 total useful floor area) that can achieve the TER based on an air permeability of 15 may not have to be tested.

How many units need to be tested?

There is a prescribed sampling rate for dwellings depending on the definition of dwelling types and whether Accredited Construction Details (ACD) have been adopted. Chiltern Dynamics typically produces a test proposal based on dwelling types as defined in ADL1A, to provide clarity for all concerned. In practice, checking whether ACD have been incorporated in drawings and on site would be a difficult task, but if building contractors are willing to confirm *in writing* that they have adopted them, this may have to be sufficient. If in fact they haven't adopted them but have claimed otherwise, the air test results are likely to expose this.

There is no sampling rate for buildings other than dwellings, ie they all need to be tested, although in practice, if initial results are good, the Building Control officer might agree a reduced number of tests on similar units on the same development.

How are units selected?

Again, this is a judgement call. On the one hand, units should be randomly selected, but, on the other, it is more important to test the first completions, to prevent repeating mistakes on later units, than to stick rigidly to random selection. This, however, often means that there is only one example of a dwelling type available to test and the results achieved are likely to represent the best performance. So further random testing may be advised where results are narrow passes and/or have been achieved with temporary sealing outside what is allowed in the test standard.

What sealing should take place in advance of testing?

Certain temporary sealing is required by the test standard ATTMA TS1 (such as the mechanical ventilation), but it is quite common for other parts of the building to be sealed up as well.

Often this is sensible eg a missing trickle vent or a broken pane of glass, but sometimes less appropriate areas, possibly even whole rooms or sections of the building, might have been sealed prior to testing. It is important therefore to check the test certificate and the report, to judge whether additional sealing has falsely enhanced the air tightness result.

Who is competent to conduct the test?

According to ADL, Building Control is authorised to accept evidence from a British Institute of Non-destructive Testing (BINDT)-registered tester, by definition therefore the preferred means of demonstrating competence.

BINDT registration can be achieved in two ways:

- As an individual (man with a van and a fan). BINDT registration for testing dwellings only can be achieved by attending an approved training course and having calibrated equipment. Bear in mind, however, that the registration is specific to that individual, not to others who may work with or for him/her.
- As a company. Generally through membership of the Air Tightness Testing and Measurement Association (ATTMA). This entails UKAS accreditation to vet procedures, equipment, training, on-site testing etc, as well as technical review by the ATTMA Technical Committee.

It is permissible to accept evidence from other sources, but some responsibility would need to be taken to check that equipment was calibrated, the test was conducted correctly and the various criteria of the test standard had been met (eg air flow exponent, correlation coefficient, static pressure readings, envelope area, etc).

Registered testers are listed on the ATTMA or BINDT websites

What are the most common air leakage/infiltration paths?

Achieving the required air permeability relies on identifying, creating and maintaining a continuous air barrier. For dwellings, this may just mean achieving a good internal finish. In more complex designs, the air barrier may be less obvious but it typically comprises external or party walls, ceilings and floors plus elements bordering 'unconditioned areas' (eg plant rooms, garages and cold roof spaces). Extensions can create particular difficulties.

In our experience, a common cause of failure is the test being carried out before the air barrier/building envelope is fully sealed. It is advisable for the contractor to discuss with the air testing body what tasks must be completed before the test.

To better understand performance and areas to look out for, it is advisable to witness a test and request that the testing body conducts a depressurisation (draw some air out of the building using the fans) which will identify air paths as draughts. This provides a real 'feel' for the type of problems that can occur and what these air permeability numbers actually mean.

Ends