

Airtightness explained

Chiltern Dynamics has issued a new free technical information sheet on air tightness testing. Head of Energy Section Tom Gregory discusses the key issues between pass and fail



Detailing, finishing and sealing between the walls, floors and ceilings that make up the air barrier is critical to achieving air tightness

Approved Document L of the Building Regulations requires new dwellings, new buildings other than dwellings and 'large' extensions to non-dwellings to achieve reasonable levels of air permeability as part of minimising heat loss through the building fabric. Performance is proven through on-site pressure testing.

The test measures the amount of heated/cooled air escaping through gaps, cracks and holes. Buildings must demonstrate that they are not losing more than 10m³ of air, every hour, across every

square metre of the 'envelope' when pressurised to 50Pa.

Identifying, creating and maintaining a continuous barrier to air leakage is the shared responsibility of the designer, building contractor and often numerous sub-contractors.

Communication is vital - if plumbers, electricians and other trades are not aware of the air barrier, they cannot maintain it. Timely inspection is also important where critical work may be hidden by panels, suspended ceilings, raised floors or boxing.

Details have been developed to support Part L1A. They effectively provide

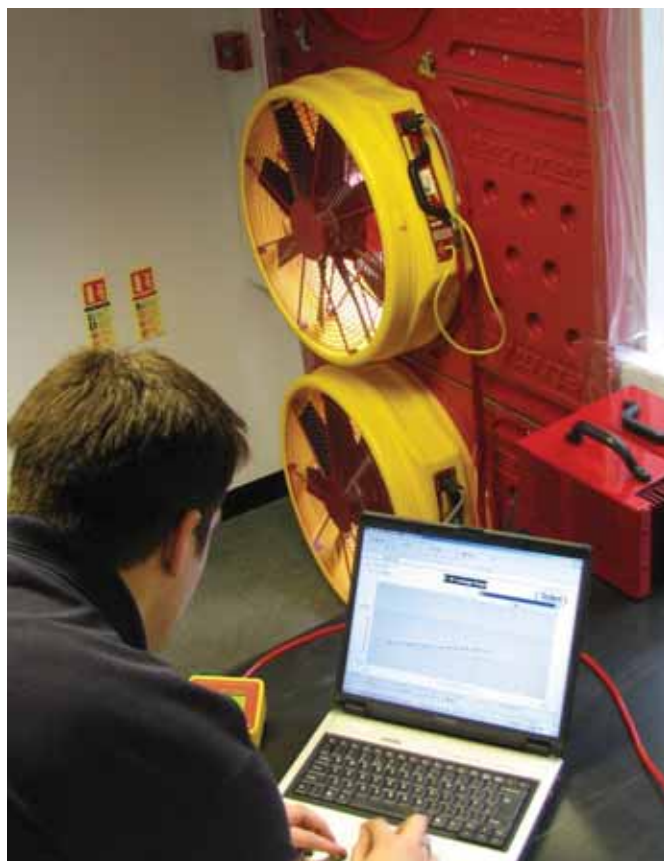
"THE DIVERSITY OF BUILDING DESIGN AND CONSTRUCTION MEANS THAT NO LIST OF POTENTIAL AIR LEAKAGE PATHS CAN BE EXHAUSTIVE"

good practice for key details with respect to insulation and air permeability. The 'Accredited Construction Details' have the added benefit of potentially reducing the number of units tested on a housing development and improving SAP ratings based on insulation. They are freely available from the Planning Portal website (see below).

The diversity of building design and construction means that no list of potential air leakage paths can be exhaustive, but assuming that the products and materials that make up the air barrier are relatively impermeable, problems are most likely to occur in two main categories: at junctions between external/party walls, floors and ceilings/roofs; and around penetrations through these elements.

The most significant air leakage paths are likely to be where a small gap is repeated along a length of the building. In many buildings, the air barrier is the internal finish or external construction, but there may be complications. Voids and risers for services can act as 'chimneys' if air can enter them and they are not sealed top and bottom. Ventilated, unconditioned spaces such as plant rooms, garages and lofts can cause air leakage unless their internal walls are treated as if they were external.

Detailing, finishing and sealing between the walls, floors and ceilings/roof that make up the air barrier are critical to achieving air tightness. For example, in industrial units it is likely that the air barrier will be formed by the internal surface of the





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◀ cladding system. We have seen problems along eaves details, where the gap between the roof and the wall has not been sealed at all or it has been sealed with mineral wool – which is air permeable.

High quality windows, professionally installed, should perform well, but we do see poor/defective products that do not close sufficiently to compress the weather seals. Problems also occur with doors when thresholds are not fitted before the test is conducted.

Other products which can

cause air leakage include:

- Trickle vents, which are closed but not sealed during testing. It is important they create a good seal and are not damaged, distorted or dirty.
- Loft hatches - in our experience, many of the plastic hatches used for domestic applications may distort or be ill-fitting.
- Industrial doors such as roller shutters with brush seals, for example, are likely to leak along the edges and at the top.

“FROM A BUILDING CONTROL PERSPECTIVE, THE TEST COULD BE CONDUCTED WHEN ALL THE PENETRATIONS HAVE BEEN MADE”

Particular care needs to be taken with all services. Heating, water and waste pipes may allow air to leak around them if not tightly sealed. Likewise, where joists and beams penetrate the air barrier, they will require careful sealing – this may be forgotten if they are ‘hidden’ above suspended ceilings.

From a building control perspective, the test could be conducted when all the penetrations have been made. However, to achieve the best result, the test should be carried out when the building is ‘complete’, typically in the last week or two of the project, when all works that impact on the air permeability have been finalised.

Two free Technical Information Sheets are available: TI-0808 – Air Tightness Testing, covering the regulatory requirements and TI-0809 Achieving Air Tightness in Buildings.

For more details, see Accredited Construction Details for Part L <http://www.planningportal.gov.uk/england/professionals/en/1115314255826.html>

‘Air tightness Testing Explained’, a one-day training course, is offered at TRADA’s High Wycombe headquarters on September 18 and November 13 2008. Cost is £125 + VAT for TRADA members and £145 + VAT for non-members. Group discounts are offered. For more information, telephone 01494 569800 or email: airtight@chilterndynamics.co.uk



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