



The  
**healthy**  
**home**

Low energy eco homes

# AIR TIGHTNESS TESTING EXPLAINED



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# INFORMATION SHEET



## AIR TIGHTNESS TESTING EXPLAINED

### What is Air Tightness Testing?

Air Tightness testing measures the degree to which heated or cooled air is being lost through leaks in a building.

In practice no building can be completely air tight however the aim is to achieve high levels of air tightness to reduce the uncontrolled loss of heated or cooled air.

### Why do we need Air Tightness Testing?

#### Environmental issues



Most energy is generated by burning fossil fuels which increases carbon emissions and contributes to the 'Greenhouse effect' and results in climate change. The Government is committed to reducing carbon emissions by 60% by 2050. Part of their strategy is to reduce the waste of energy as a result of leaky buildings. To this end the Government introduced changes in Building Regulations under Part L to achieve a 20% reduction in carbon emissions for all newly constructed buildings, which came into force in England and Wales in April 2006. It is very likely that these Regulations will be tightened up further over the coming years.

#### Cost

The cost of fuel is increasing rapidly and supplies of fossil fuels are limited. We cannot afford to waste energy anymore. Up to 40% of the overall building's heat loss is through ventilation alone, which will result in doubling fuel bills for their occupants.

#### Who does this concern?

Architects and designers need to specify appropriate precautions for air-tightness and link them into their methods of construction in order to achieve the new standards.

House builders and developers need to introduce new quality assurance monitoring and keener attention to detail to ensure that air tightness becomes the norm in all their buildings.

Building Control officers need to enforce the new standards rigorously and ensure that Air Tightness testing is carried out to the requirements of Building Regulations.



## What is the process for Air Tightness testing?

### Before the test

#### The Tester will need the following information:

- Site location
- Site layout to establish the different types of house on the site, which will determine the number of tests required on the site
- Are you using Accredited Construction Details? This affects the number of tests required
- A copy of the building plans including floor layouts and sections in order to calculate the envelope area of each type
- A copy of the SAP assessment in order to establish the design permeability
- Any specific requirements for the scheduling of the test
- Contact details for the Site Manager

### What preparations are needed for the test?

- ✦ Tests are usually carried out after second fix
- ✦ All service penetrations must be sealed inside and out
- ✦ Trickle vents are fitted (where specified)
- ✦ Loft access hatch is fitted and sealed
- ✦ Check sealing around floor and ceiling joints, staircases, skirting boards, doors, windows and boiler flue
- ✦ Water supply is on
- ✦ Lights and electrical points fitted (downlights should be boxed in or have intumescent hoods)
- ✦ Check no obvious holes in building envelope

### The day of the test

- ✦ Tester arrives on site
- ✦ Check weather conditions (wind, temperature) within specified limits
- ✦ Visual check of building for any obvious problem areas (waste pipes, soil stacks, staircases, round windows and sills, skirting boards etc)
- ✦ Check no obvious holes in building envelope
- ✦ Seal extractor fans, close trickle vents, wedge open internal doors and ensure water in traps
- ✦ Set up fan in suitable opening (usually front door)
- ✦ Set up equipment
- ✦ Start pressurisation/depressurisation and take measurements which are then used to calculate air flow rates through a range of staggered pressures.

A Pressure testing door in situ



### What values must be achieved for a pass?

The **maximum** level for air permeability is  $10 \text{ m}^3/\text{h}/\text{m}^2$  at 50 Pa. However the value set by the designer may be less than 10 in order to achieve the design target carbon emission rate for SAP required by Building Regulations. When designers set very low targets for air permeability they should consider whether the construction method as a whole can achieve the air tightness required. There are also ventilation issues to be considered in very air tight dwellings (less than  $5 \text{ m}^3/\text{h}/\text{m}^2$  at 50 Pa) – standard trickle vents would not be classed as an adequate source of ventilation in this case, some form of mechanical controlled ventilation should be considered to guarantee good, healthy air quality.

## The Stages of Air Tightness Testing

The Equipment used in an Air Tightness Test



Taking wind and temperature measurements

Taking barometric pressure measurements



Setting up the Pressure testing door

Carrying out the test, recording the measurements and calculating the results.



## Which buildings must be tested?

### Non-dwellings

All buildings must be tested except:

- ✦ Building under 500 m<sup>2</sup> – these may use a default value of 15 m<sup>3</sup>/h/m<sup>2</sup>
- ✦ Factory made modular buildings may be tested by an independent approved body

Very large building may not be practical to test and a special programme of design, sample testing and monitoring needs to be in place

All extensions to existing non-dwellings which are:

- Over 100m<sup>2</sup>
- Over 25% of usable floor area

### Dwellings

If Accredited Construction Details are being used:

1 test per dwelling type

If Accredited Construction Details are not being used:

No. of units of dwelling type	No. of tests required
4 or less	One test per type
Between 4 and 40	Two tests per type
Over 40	5% per type If first 5 tests achieve design AP, can reduce to 2% per type

### Definition of Dwelling Type

The following are considered different dwelling type:

- ✦ Different method of construction
- ✦ On a Different floor (ground floor flat, mid-floor, top-floor)
- ✦ End of terrace
- ✦ Mid terrace
- ✦ Detached
- ✦ Semi-detached
- ✦ Significant difference in floor area (greater than 15%)
- ✦ Different number of significant penetrations (doors, windows, flues) ±1

Warm roof or cold roof

It is recommended on a large development that 50% of the Air Tightness tests should be carried out on the first 25% of each dwelling type to demonstrate that the buildings are complying with Building Regulations and to remedy any significant problems early on.

### Where a dwelling type fails a test



After remedial works have been carried out, the dwelling should be retested and under Building Regulations one additional dwelling of the same type should be tested.

Testing with a smoke pen to find location of leakage.



**How can The Healthy Home help you?**

- ⇒ **We can review your designs to advise on air tightness issues at the earliest stage and avoid costly changes later on**
- ⇒ **Provide training and advice on Accredited Construction Details**
- ⇒ **We can carry out Pre-testing site inspections and advise you on preparing dwellings for testing**
- ⇒ **We carry out testing - all our testers are fully trained and qualified**
- ⇒ **On problem sites we can offer Thermo-graphic imaging service**
- ⇒ **We offer training courses on Air Tight Construction methods and Ventilation issues as well as courses on other environmental issues in Building.**

**All our testing is carried out in accordance with the regulations set out in Building Regulations: Approved Document Part L1A: Conservation of Fuel and Power in New Dwellings and ATTMA TS1 Issue2 (for dwellings) and Part L2A (for non-dwellings).**

For further details please do not hesitate to contact us:

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**OTHER SERVICES AVAILABLE FROM THE HEALTHY HOME:**

- SAP AND SBEM ASSESSMENTS
- CODE FOR SUSTAINABLE HOMES ASSESSMENTS
- ECOHOMES ASSESSMENTS
- HEAT RECOVERY VENTILATION SYSTEMS DESIGN AND SUPPLY
- WHOLE HOUSE VENTILATION SYSTEMS SUPPLY
- ADVICE CONSULTANCY AND TRAINING ON DESIGN OF RENEWABLE AND LOW ENERGY SYSTEMS
- ADVICE CONSULTANCY AND TRAINING ON ENVIRONMENTAL AND SUSTAINABLE BUILDING AND RENOVATION METHODS

