BUILDING AIRTIGHTNESS BASICS

Diane Hubbard
Green Footsteps

16 April 2020

PEOPLE POWERED RETROFIT

CarbonCo-op

Diane Hubbard

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- Energy assessment & calculations
- Air tightness & air movement in buildings (new and existing)
- Thermography

- Mechanical engineer
- Certified Passivhaus Consultant
- Level 2 Building Thermography
- NICEIC Domestic Ventilation

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Infiltration

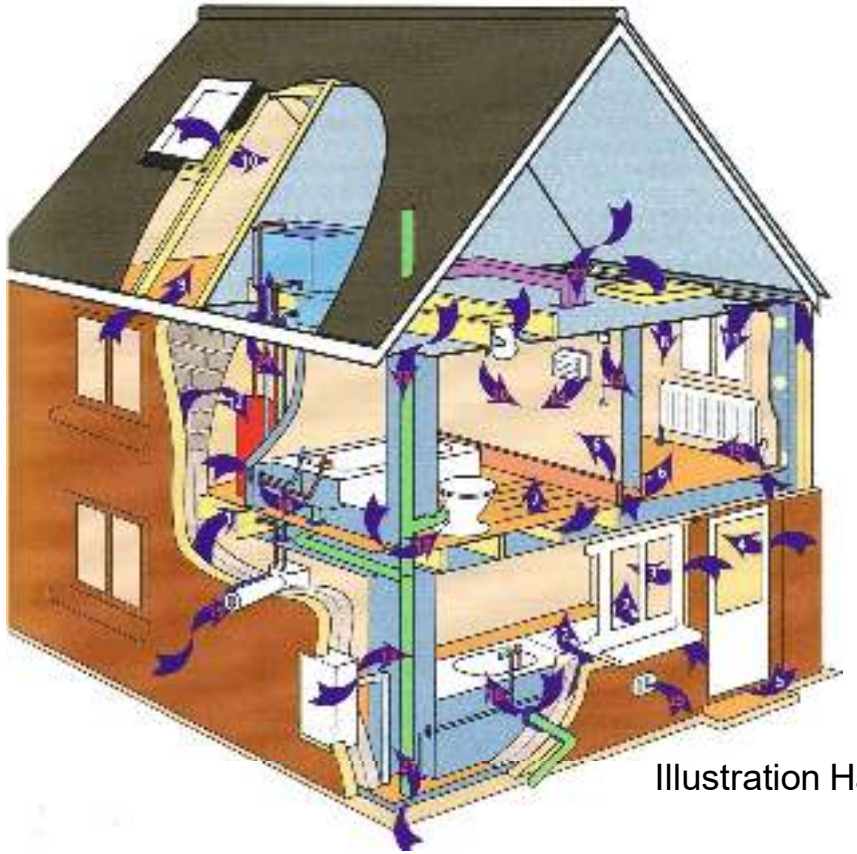

Illustration Hall (ed.) 2008

The uncontrolled flow of air through gaps and cracks in the building fabric

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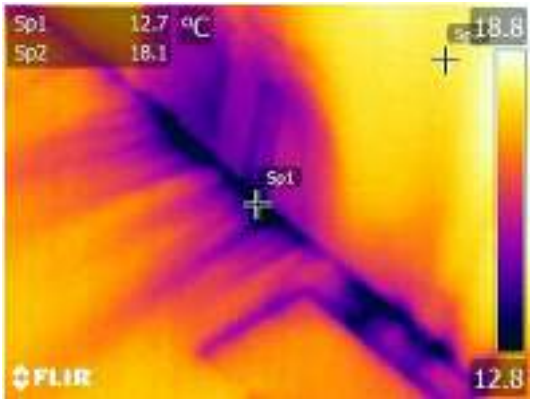
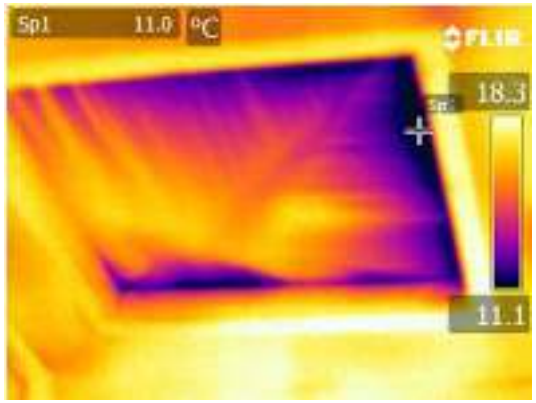
Infiltration - quantification





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Why is airtightness important?

- Infiltration increases energy use
- Thermal bypass of insulation
- Moisture ingress into building fabric
- Ventilation system performance

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Infiltration - quantification

Blower door test

- Permanent points of ventilation covered or closed
- Boiler flues, chimneys, extractors, trickle vents closed / taped

Air permeability

- Air flow per m^2 of dwelling envelope
- m^3/hm^2 @50Pa

Air changes per hour

- Relates to the building volume
- ach @50Pa

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Air permeability vs air change rate

If both have an air change rate (ach of 5, which has the better air permeability?

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Airtightness benchmarks

NB Air permeability vs air change rate

- **≤ 0.6 ach@50Pa** - Passivhaus
- **10m^3/hm^2@50Pa** - Limit for UK new build dwellings - tends to be used as benchmark
- **5m^3/hm^2@50Pa** **-** Typical major housebuilder (gas central heating)
- **3m^3/hm^2@50Pa** **-** Part F MVHR / MEV

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Which building has the best air permeability?

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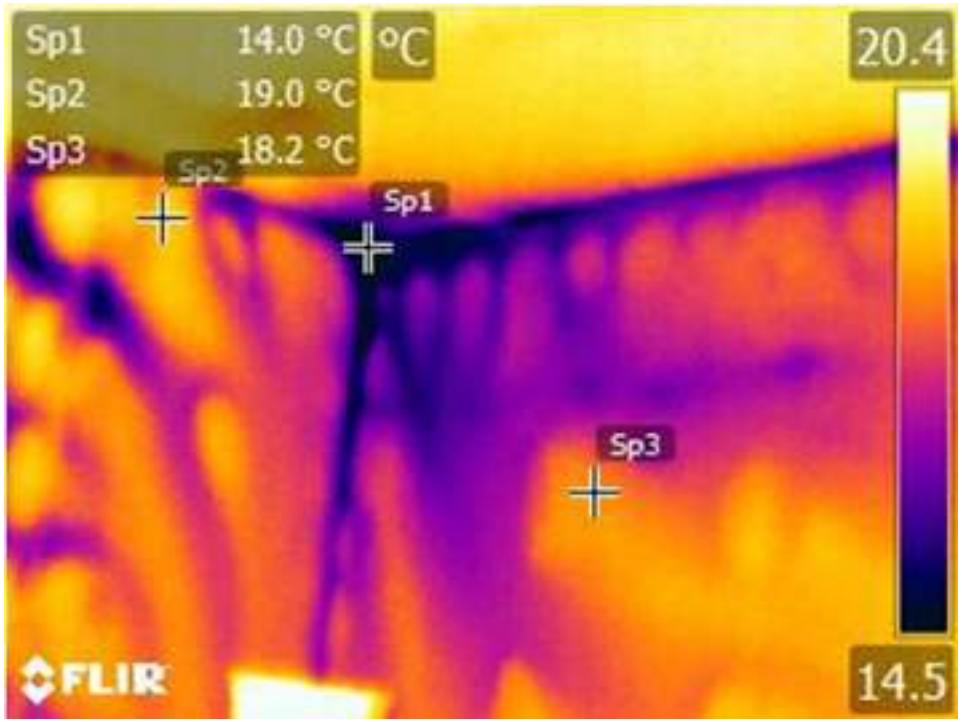

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How to achieve airtightness

1. Know where you are starting from
2. Decide what your target it is
3. Develop a strategy to achieve this
4. Workmanship and quality assurance on site to achieve your aim

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How to achieve airtightness

1. Know where you are starting from

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How to achieve airtightness

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How to achieve airtightness

2. Decide what your target is

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How to achieve airtightness

3. Develop a strategy

- Design it in.
- It’s not all about fancy materials

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How to achieve airtightness

3. Develop a strategy

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How to achieve airtightness

4. Workmanship and quality assurance on site to achieve your aim

- Workmanship on site – control:
  - Clear goals and specification
  - Air tightness champion
  - individual worker responsibility
  - Avoid blame, emphasise importance of problems being corrected

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More than airtightness…

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