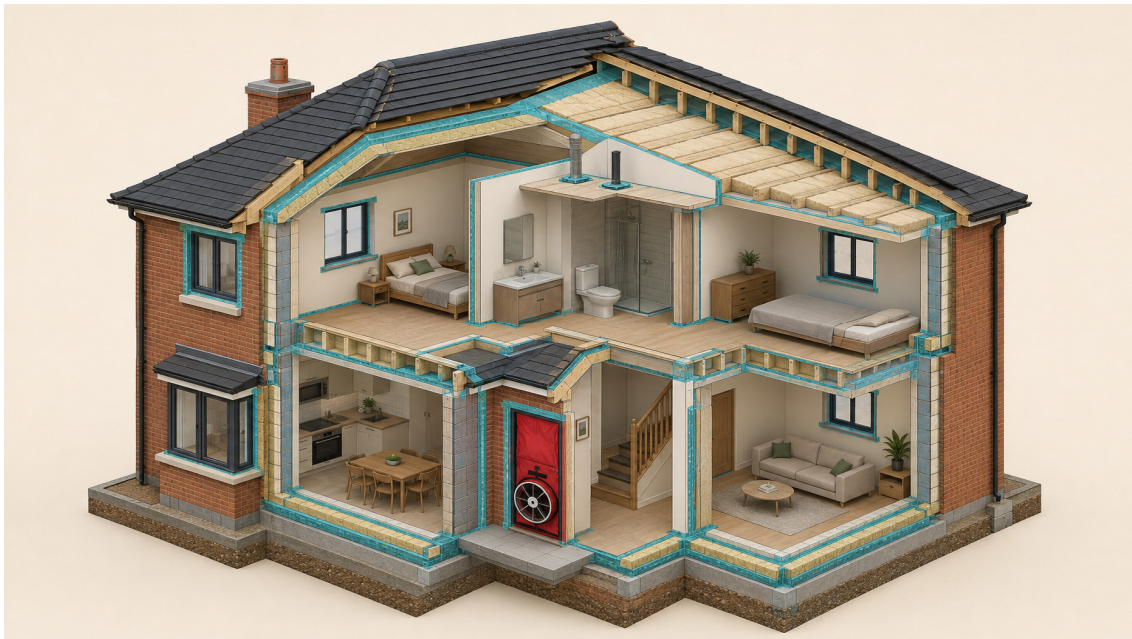


HOUSEPLANSDIRECT TECHNICAL GUIDES

AIRTIGHTNESS EXPLAINED

A complete guide to air barriers, junctions, ventilation and pressure testing



Airtightness depends on one continuous, durable air barrier connected across every element and penetration.

NINE-PART PUBLICATION EDITION

Principles · Air Leakage · Materials · Junctions · Services · Ventilation · Testing · Compliance · Inspection

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Contents

Part	Subject
Part 1	Introduction: What Is Airtightness?
Part 2	Air Leakage, Infiltration and Thermal Bypass
Part 3	Air-Barrier Strategies and Materials
Part 4	Openings, Services and Structural Penetrations
Part 5	Floors, Walls, Roofs and Construction Sequence
Part 6	Intermediate Floors, Testing and Leakage Detection
Part 7	Building Regulations, Test Evidence and Safety
Part 8	Common Airtightness Defects
Part 9	Inspection Checklist, FAQs, Glossary and Further Reading

About this guide

This guide explains airtightness in low-rise homes in England, including air leakage, infiltration, thermal bypass, air-barrier materials, masonry and timber-frame strategies, openings, services, floors, roofs, pressure testing and ventilation. It is for clients, designers and site teams. Airtightness is not the elimination of ventilation: unwanted leakage should be controlled while intentional ventilation is designed, commissioned and maintained. Project calculations, drawings, test methodology and Building Control requirements take precedence.

SCOPE Airtightness is project-specific. Energy, ventilation, moisture, fire and combustion design, approved drawings, current test methodology, product instructions and Building Control decisions take precedence. Figures are explanatory and must not be scaled.

Part 1 – Introduction: What Is Airtightness?

Resistance of the building envelope to unintended air movement when ventilators are closed

Airtightness describes how effectively the envelope limits uncontrolled air leakage through cracks, joints and penetrations. It reduces avoidable heat loss, draughts and moist-air movement into construction. It can also improve comfort, acoustic control and ventilation-system performance. The target is achieved by a clear air-barrier line, compatible materials, buildable junctions, protected installation and testing—not by sealant applied at the end.



Figure 1 – Complete dwelling with continuous air barrier and blower-door test setup.

1.1 Principal concepts

Component	Primary role
Primary air barrier	Forms one continuous low-leakage plane around the conditioned space.
Junction seals	Connect floors, walls, roofs, frames and adjacent barrier materials.
Penetration seals	Accommodate pipes, cables, ducts and movement without gaps.
Insulation adjacency	Prevents air circulating around or through thermal layers.
Designed ventilation	Provides intentional supply, extract, purge and transfer air routes.

1.2 Benefits and cautions

- Lower unintended leakage reduces infiltration heat loss and local draughts.
- Air leakage can carry moisture into roofs and walls even where vapour diffusion is controlled.
- Very airtight construction requires reliable designed ventilation and safe combustion arrangements.
- A pressure-test result is a whole-building number; it does not show where every leak is located.

KEY PRINCIPLE Draw one continuous air-barrier line around every conditioned space without lifting the pen. Then detail, install, protect, inspect and test every change in material and penetration.