What is Airtightness?

Airtightness refers to the extent to which a building's envelope prevents uncontrolled air leakage between the interior and exterior. It is a critical factor in energy efficiency, thermal comfort, and indoor air quality. In the UK, airtightness is measured in air permeability, expressed as cubic metres of air leakage per hour per square metre of building envelope area ($m^3/h/m^2$) at a pressure difference of 50 Pascals (Pa).

Airtightness is essential for reducing heat loss, minimising energy consumption, and ensuring compliance with UK Building Regulations, particularly Part L (Conservation of Fuel and Power). Poor airtightness can lead to draughts, condensation, and increased heating costs. Achieving good airtightness requires careful design, detailing, and construction practices, including the use of airtight membranes, seals, and tapes.

Practical Examples:

1. **New Builds:** In a new residential development, airtightness is achieved by installing continuous airtight membranes in walls and roofs, sealing joints around windows and doors, and using airtight service penetrations.
2. **Retrofit Projects:** In a retrofit, improving airtightness might involve adding internal or external insulation, sealing gaps around loft hatches, and addressing cracks in walls or floors.
3. **Extensions:** For a home extension, ensuring airtightness could include integrating the new structure's envelope seamlessly with the existing building, using airtight drylining systems, and sealing around new windows and doors.

Related Terms

1. **Building Envelope:** The physical barrier between the interior and exterior of a building, including walls, roofs, windows, and doors.
2. **Air Permeability:** The measure of airtightness, expressed as $m^3/h/m^2$ at 50 Pa.
3. **Thermal Bridging:** Heat transfer through materials that bypass insulation, often exacerbated by poor airtightness.
4. **Mechanical Ventilation with Heat Recovery (MVHR):** A system that provides controlled ventilation while recovering heat from outgoing air, often used in airtight buildings.
5. **U-value:** A measure of heat loss through a building element, influenced by airtightness.
6. **Part L (Building Regulations):** The section of UK Building Regulations that sets standards for energy efficiency, including airtightness.
7. **Blower Door Test:** A diagnostic tool used to measure the airtightness of a building.