What are Air Changes per Hour (ACH)?

Air Changes per Hour (ACH) is a measure of how many times the air within a room or space is completely replaced with fresh air in one hour. It is typically expressed in units of m^3/h (metres cubed per hour) or l/s (litres per second). ACH is a critical metric in assessing ventilation efficiency, particularly in residential and commercial buildings, to ensure healthy indoor air quality and compliance with building regulations.

Synonyms:

- Air Change Rate (ACH/ac/hr)
- Air Exchange Rate
- ACPH (alternative abbreviation)

Explanation:
ACH is calculated by dividing the volume of air supplied or extracted from a room by the total volume of the room. For example, if a room has a volume of 50 m^3 and the ventilation system supplies 150 m^3 of fresh air per hour, the ACH is 3. This means the air in the room is replaced three times every hour.

In the UK, ACH is a key consideration in building design and retrofit projects, particularly for ensuring compliance with **Part F of the Building Regulations** (Ventilation). Approved Document F provides specific guidance on minimum ventilation rates for different types of rooms, such as living rooms, kitchens, and bathrooms, to prevent issues like condensation, mould growth, and poor indoor air quality.

Practical Example:
In a newly built UK home, the kitchen may require an ACH of 6–10 to effectively remove cooking odours, moisture, and pollutants. This is often achieved through mechanical extract ventilation (MEV) or intermittent extract fans, which must meet the performance standards outlined in Approved Document F.

Related Terms:

1. **Mechanical Ventilation with Heat Recovery (MVHR):** A system that provides controlled ventilation while recovering heat from extracted air, improving energy efficiency.
2. **Passive Ventilation:** Natural airflow through windows, vents, or other openings without mechanical assistance.
3. **Indoor Air Quality (IAQ):** The quality of air within a building, influenced by factors like ventilation, pollutants, and humidity.
4. **Building Regulations Part L:** Focuses on energy efficiency, which intersects with ventilation strategies to reduce heat loss.
5. **Condensation Risk:** A key concern addressed by adequate ventilation to prevent moisture buildup and mould growth.
6. **Intermittent Extract Fan:** A fan used in kitchens and bathrooms to provide short bursts of high ventilation rates.
7. **Whole House Ventilation:** A system designed to provide consistent ventilation across an entire building, often used in airtight homes.