Passive Stack Ventilation (aka “System 2”)

Passive Stack Ventilation (PSV) is a natural ventilation system that uses the principle of stack effect (warm air rising) to extract stale, moist air from internal spaces (e.g., kitchens, bathrooms) via vertical ducts or shafts. Fresh air is passively drawn into the dwelling through background ventilators (e.g., trickle vents in windows or walls).

Key Features

- **Natural operation**: Relies on temperature differences and wind pressure, with no mechanical fans.
- **Components**: Vertical ducts (often insulated), ceiling/wall vents, and background ventilators.
- **Heat recovery**: Some proprietary systems integrated heat recovery, though this was uncommon.
- **Dependence on weather**: Performance fluctuates with wind speed/direction and outdoor temperatures.

Context in UK Building Regulations

- **2010 Regulations**: Referred to as **“System 2”** in Approved Document F (2010), PSV was a compliant solution for whole-dwelling ventilation in less airtight homes.
- **2022 Update**: PSV was **removed** from Approved Document F (2022) due to:
  - **Unreliable performance**: Inconsistent airflow in modern, airtight dwellings.
  - **Energy efficiency concerns**: Lack of heat recovery in most systems led to heat loss.
  - **Shift to mechanical systems**: Preference for continuous mechanical extract ventilation (MEV) or mechanical ventilation with heat recovery (MVHR) for controlled, efficient airflow.

Relevance to UK Sectors

- **New Builds**: No longer compliant under 2022 regulations. Developers now use MEV/MVHR.
- **Retrofits**: PSV may still exist in older properties. Retrofit advisors often recommend upgrading to mechanical systems for better humidity control.
- **Historic Buildings**: Occasionally used in heritage projects where visible vents/ducts are restricted, but performance is closely monitored.

Key Standards

- **BS 5925:1991**: Code of practice for ventilation principles (referenced in older PSV designs).
- **Approved Document F (2022)**: Mandates mechanical systems for dwellings with air permeability ≤5 $m^3/(h \cdot m^2)$ at 50 Pa.

Why It Matters

PSV highlights the evolution of UK ventilation standards towards **energy efficiency** and **reliability**. Its removal from regulations reflects lessons learned about the limitations of passive systems in modern, airtight homes. For retrofit specialists, understanding PSV’s legacy is critical when assessing and upgrading older properties.