

What's the Impact of Trickle Vents on Indoor Air Quality?

Trickle vents have limited effectiveness in maintaining indoor air quality, increasing air change rates by just $1.8\text{m}^3/\text{h}/\text{m}^2$ when fully open. Studies show high CO_2 levels in airtight homes relying on trickle vents, with bedroom averages of 1,571 ppm - far above the recommended 1,000 ppm threshold. Furthermore, 63% of occupants keep vents closed, reducing their effectiveness.

Understanding Trickle Vents and Their Role in Ventilation

Trickle vents are small openings integrated into window frames to provide background ventilation. They are designed to allow a controlled flow of fresh air into buildings, particularly modern airtight homes, where natural infiltration is minimal. However, while they aim to improve air quality, their real-world impact raises concerns.

How Do Trickle Vents Work?

Trickle vents rely on passive airflow, driven by differences in pressure between indoor and outdoor environments. Unlike mechanical ventilation systems, they do not actively move air but instead depend on natural forces such as wind or temperature gradients.

While they seem like a straightforward solution, their efficiency is often compromised by external factors, including occupant behaviour, environmental conditions, and the limitations of passive systems in airtight homes.

The Key Issues with Trickle Vents

1. Limited Ventilation Performance

Research highlights that trickle vents contribute minimally to overall ventilation. According to Roberts et al. (2017), they increase air change rates by only $1.8\text{m}^3/\text{h}/\text{m}^2$ when fully open. This rate falls short of the ventilation levels required to maintain healthy indoor air quality, particularly in modern dwellings designed with high levels of airtightness.

2. High CO_2 Concentrations

Studies demonstrate that trickle vents often fail to prevent harmful CO_2 build-up in airtight homes:

- **Sharpe et al. (2015)** found bedroom CO_2 levels averaged **1,571 ppm**, exceeding the **1,000 ppm threshold** recommended for occupant health and cognitive performance.
- **Howieson et al. (2014)** observed even higher peak CO_2 levels of **2,317 ppm** in homes relying solely on trickle ventilation.

Elevated CO_2 levels can lead to fatigue, reduced concentration, and long-term health risks.

3. Occupant Behaviour

One of the most significant barriers to trickle vent effectiveness is how occupants use them. Sharpe et al. (2015) reported that **63% of bedroom trickle vents remain closed**, primarily due to

concerns about:

- **Drafts:** Occupants often feel cold air entering through the vents, particularly during winter.
- **Noise:** External noise pollution can discourage users from keeping vents open.
- **Energy Loss:** Open vents can lead to heat loss, increasing heating costs and making them less appealing in energy-conscious households.

4. Poor Air Distribution

Trickle vents do not actively distribute air throughout a room or dwelling. This can result in uneven ventilation, with stagnant air persisting in certain areas. In comparison, mechanical systems like **continuous mechanical ventilation with heat recovery (MVHR)** ensure balanced air distribution and consistent air quality.

5. Potential for Blockages

Dust, debris, and even insects can obstruct trickle vents over time, further limiting their already modest airflow capacity. Regular maintenance is required, but this is often overlooked by homeowners.

The Hidden Costs of Poor Ventilation

When trickle vents fail to provide adequate ventilation, the consequences can be significant:

- **Mould and Damp:** Insufficient airflow allows moisture to accumulate, leading to condensation on walls and windows. Over time, this creates ideal conditions for mould growth, which can damage property and trigger respiratory issues.
- **Health Risks:** Poor indoor air quality is linked to a range of health problems, including allergies, asthma, and impaired cognitive function. Prolonged exposure to high levels of CO₂ and indoor pollutants can exacerbate these issues.
- **Energy Inefficiency:** While trickle vents are passive, their use can inadvertently increase heating demands as warm air escapes through the vents, especially in winter.

Alternatives to Trickle Vents

Given the limitations of trickle vents, it is worth exploring more effective ventilation solutions:

1. Mechanical Ventilation with Heat Recovery (MVHR)

MVHR systems, such as VENTI's FLUXO units, provide continuous, balanced ventilation by actively supplying fresh air and extracting stale air. Key benefits include:

- **Heat Recovery:** Up to **82% of heat** is retained, reducing energy costs.
- **Consistent Air Quality:** MVHR systems maintain CO₂ levels well below harmful thresholds.
- **Filtered Air:** Incoming air is filtered, removing pollutants, allergens, and particulate matter.

2. Continuous Mechanical Extract Ventilation (CMEV)

CMEV systems continuously extract air from wet rooms (e.g., kitchens and bathrooms), ensuring moisture and pollutants are removed before spreading throughout the home.

3. Smart Ventilation Controls

Modern ventilation systems often include sensors for humidity, CO₂, and occupancy, automatically adjusting ventilation rates to meet real-time needs. This ensures optimal air quality without the need for manual intervention.

Why Choose FLUXO Over Trickle Vents?

At VENTI, we believe in empowering people to breathe freely. That's why our **FLUXO units** are designed to address the shortcomings of traditional ventilation methods like trickle vents:

- **Continuous Fresh Air:** FLUXO provides uninterrupted airflow, ensuring your home is always well-ventilated.
- **Energy Efficiency:** With **82% heat recovery**, FLUXO reduces energy waste and keeps heating costs low.
- **Aesthetic Design:** Unlike unsightly trickle vents, FLUXO integrates seamlessly into modern interiors without compromising aesthetics.
- **Customisable Control:** Users can switch between fresh air supply and extract-only modes, tailoring ventilation to their needs.

Trickle vents offer limited ventilation benefits, often failing to meet the demands of modern airtight homes. For healthier indoor air and energy efficiency, consider advanced solutions like VENTI's FLUXO systems.