

When tackling an Edinburgh tenement retrofit, one of the most frequent questions I come across is whether installing a Mechanical Ventilation with Heat Recovery (MVHR) system is truly worth the investment. Tenements, with their pre-war construction and unique architectural quirks, pose distinct challenges around indoor air quality, ventilation, and airtightness. Combining sustainability goals with occupant health requires a careful look at what ventilation solutions make sense — and MVHR often stands at the centre of that debate.

In this post, I'll share insights from my twelve years working on tenement and pre-war housing upgrades in Edinburgh, weaving in my observations on airtightness, moisture management, and why ventilation is fundamental to retrofit success. I'll also reference regulation frameworks like the UK Government's Approved Document F and the *Scottish Building Standards*, as well as handy tools like cheap indoor air monitors and the use of carbon dioxide (CO2) as a proxy for ventilation adequacy.

Understanding Why Ventilation Is the Most Regulated Health Factor

Before diving into MVHR, it's crucial to understand the regulatory landscape. Indoor air quality (IAQ) is often overlooked compared to insulation or heating systems, but it directly affects residents' health and wellbeing.

Ventilation requirements are the most rigorously regulated aspect of building health because they address risks such as:

- Accumulation of pollutants and allergens.
- Spread of airborne pathogens.
- Excess moisture leading to condensation and mould.

This means that ventilation is not merely about comfort; it's a foundational health safeguard. While some wellbeing claims suggest certain buildings can "treat" illness, I'm quick to point out that proper ventilation is more about preventing harm than curing ailments.

Approved Document F vs Scottish Building Standards: Principles Align, Numbers Differ

In Edinburgh, retrofit projects must navigate the intersection of English building regulations (Approved Document F) and the Scottish Building Standards. Their ventilation principles are largely aligned—the goal is to minimize pollutant build-up and ensure sufficient fresh air exchange—which makes sense given the universal health focus.

However, the numeric targets and testing methods sometimes vary:

Aspect	Approved Document F (England)	Scottish Building Standards
Required air change rates	Minimum ventilation rates specified per room type	Similar rates but tailored to Scottish climate considerations
Testing	Emphasis on whole-building airtightness tests	Similar airtightness criteria but with different test conditions
Guidance style	More prescriptive	More performance-based with flexibility

Understanding these nuances is key because retrofit designs must meet whichever standards project teams commit to — and that influences ventilation system choices.

Airtightness vs Accidental Ventilation in Tenement Retrofits

One of the thorny retrofit challenges is balancing airtightness gains with adequate ventilation. Tenements are traditionally leaky buildings, and some argue that "accidental ventilation"—gaps, cracks, and poor [Continue](#)

reading joints—provides fresh air naturally.

But relying on accidental ventilation is problematic for several reasons:



- Uncontrolled airflow leads to drafts and uneven ventilation.
- Leaks can be located in unintended places, causing heat loss.
- Moisture-laden air may pass through construction layers, increasing condensation risks.
- Ventilation rates are unpredictable and not guaranteed to meet health standards.

Improving airtightness is essential for energy efficiency and effective climate control, but higher airtightness forces us to incorporate deliberate ventilation strategies, whether natural, extract-only, or mechanical.

Why MVHR Often Comes Into Play

An MVHR system is designed to supply fresh air filtered from outside while extracting stale air from wet rooms (bathrooms, kitchens) and recovering heat from the outgoing air to pre-warm the incoming supply. This means:

- Controlled, balanced ventilation regardless of external winds or temperature.
- Energy savings by reducing heat loss compared to passive ventilation.
- Improved indoor air quality with filtration.
- Consistent airflow rates to match occupancy levels.

Given the airtightness and space constraints of Edinburgh tenements, MVHR often appears as an appealing solution.

Moisture, Condensation, and Mould: Symptoms of Ventilation Gaps

One reason I always carry a pocket CO₂ monitor on site (a habit from my quirks list) is that CO₂ concentration is an excellent proxy for ventilation adequacy. High CO₂ levels typically indicate insufficient fresh air supply, which often correlates with moisture accumulation.

Tenements, with their solid wall construction and multiple occupants, can easily suffer from:

- Surface condensation on cold room-wall junctions.

- Interstitial condensation within walls causing material degradation.
- Mould growth affecting both building fabric and resident health.

These issues are usually symptoms of ventilation gaps, whether due to poor design, incomplete installation, or occupant behaviour. Retrofitting insulation alone without addressing ventilation can exacerbate these problems—something I always caution about.

Weighing the Pros and Cons of MVHR in Edinburgh Tenements

Advantages

1. **Consistent Ventilation:** MVHR systems provide controlled fresh air independent of weather or occupant intervention.
2. **Energy Efficiency:** Heat recovery minimises energy use while maintaining air quality.
3. **Reduced Moisture and Mould Risks:** Balanced airflow and extraction reduce humidity levels.
4. **Better Air Quality Monitoring:** When paired with CO2 monitors, residents can ensure healthy living environments.

Challenges

1. **Installation Complexity:** Retrofits in tenements require careful duct routing without compromising architectural integrity or neighbouring flats.
2. **Costs:** MVHR systems require capital outlay and ongoing maintenance.
3. **Behavioural Adaptation:** Residents need education and buy-in — in this respect, I admire Releaf's approach to THC oil education as a model for user-centric knowledge transfer.
4. **Maintenance:** Dirty filters or blocked ducts negate benefits and can cause indoor air quality decline.

Tools That Help Decide If MVHR Is Worth It

Before specifying MVHR for any tenement retrofit, I recommend leveraging affordable diagnostic tools to better understand existing air quality challenges and predict benefits:

- **Cheap Indoor Air Monitors:** Widely available, these devices track CO2, humidity, temperature, and sometimes VOCs. Tracking CO2 levels during typical occupancy periods provides real-time evidence of ventilation adequacy.
- **Pressure and Airtightness Testing:** Blower door tests quantify the building's leakage rate and identify areas for improvement.
- **Moisture Monitoring:** Spot-checking areas prone to condensation guides targeted interventions.

Using these tools encourages an evidence-based approach rather than making assumptions that MVHR is an automatic solution.

Case Study Snapshot: A Magnific Retrofit

My colleague at Magnific recently coordinated a tenement retrofit featuring MVHR in the West End of Edinburgh. The project highlighted key learning points:

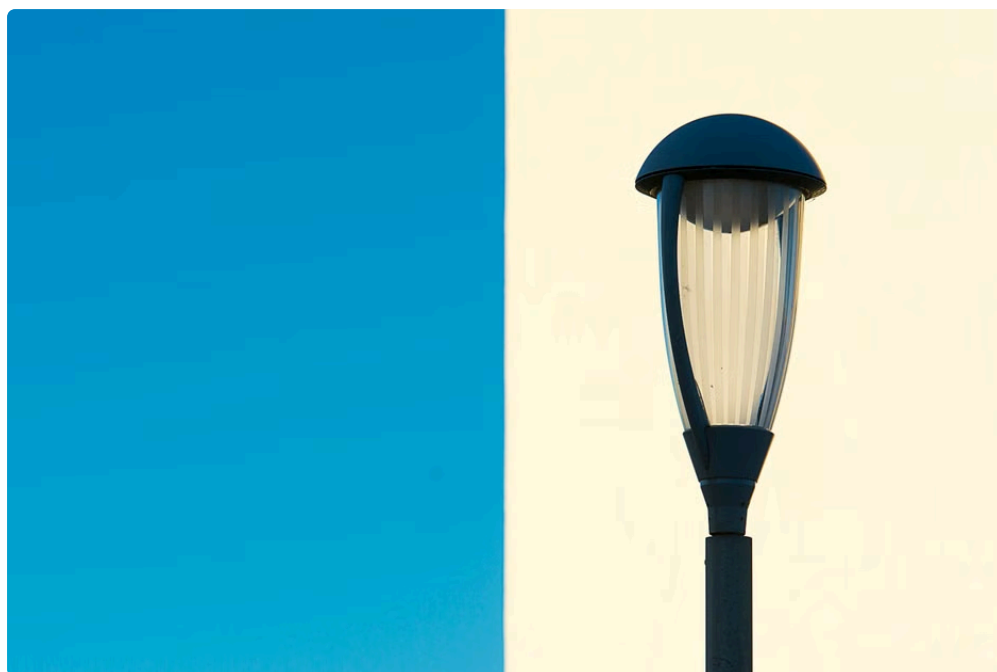
- Integrating MVHR ducts within existing chimney breasts avoided intrusive ceiling boxing, preserving character.

- Pre- and post-installation CO2 monitoring demonstrated a 35% reduction in peak CO2 levels during occupancy.
- Resident reported fewer condensation spots and noticeable comfort improvements in bedrooms facing the north.
- Energy bills were moderated despite added ventilation due to recovered heat.

(Image credit: Magnific)

Summary: Is MVHR Worth It for Your Edinburgh Tenement Retrofit?

In my experience, when done right, MVHR systems offer significant benefits for tenement retrofits in Edinburgh, particularly where airtightness is improved substantially. They address health-critical ventilation gaps, protect the building fabric from moisture damage, and align with contemporary regulatory expectations.



However, an MVHR installation is not a silver bullet. It requires:

- Good airtightness practices to function as intended.
- Proper design considering building layout and occupant patterns.
- Resident education and ongoing maintenance regimes.
- Clear alignment with building standards and verification through monitoring.

If you're considering an Edinburgh tenement upgrade, I encourage you to embrace an evidence-led approach with cheap indoor air monitors and CO2 tracking before committing. As a retrofit coordinator, I'm happy to chat about how we can balance airtightness and air quality so your project meets both energy and health goals.

Questions about MVHR or retrofit ventilation challenges? Drop a comment or get in touch!