



HOME VENTILATION SERIES · PART 1 OF 4

# Why Your Home Needs Better Air

A guide to indoor air quality for New Zealand homeowners

## IN THIS SERIES

**Part 1 (this guide) — Why your home needs better air**

Part 2 — Humidity, heating & NZ's ventilation rules

Part 3 — Your ventilation options explained

Part 4 — Choosing, costing & caring for your system

Walking into a home that smells damp, musty, or simply 'closed-in' is an experience many New Zealanders know all too well. That lingering moisture is not just unpleasant — it is a warning sign. In a country where outdoor humidity regularly exceeds 80% and winters can feel persistently cold and wet, poor ventilation leads to mould, structural damage, and serious health problems including asthma and allergies.

This guide is the first in a four-part series on home ventilation. It explains why indoor air quality matters, how New Zealand's unique climate creates specific challenges, and why the way we build homes today makes those challenges worse — not better.



## INDOOR AIR QUALITY

## The Air Inside Your Home May Be More Polluted Than You Think

Research consistently shows that people spend approximately 90% of their time indoors — and that indoor air is often significantly more polluted than outdoor air. Without adequate ventilation, the air inside a home gradually accumulates a complex mixture of contaminants.

*“A 2019 University of Otago study linked poor ventilation to a 30% higher risk of respiratory illness in children.”*

The main indoor air quality concerns in New Zealand homes include:

- **Carbon Dioxide (CO<sub>2</sub>):** exhaled by every occupant, CO<sub>2</sub> accumulates in enclosed spaces. Sealed bedrooms overnight can exceed 2,000 ppm — more than double the recommended limit — causing drowsiness, headaches, and reduced concentration.
- **Mould spores & dust mites:** both thrive in damp, poorly ventilated environments and release allergens that trigger asthma and respiratory irritation — among the most prevalent indoor air quality issues in New Zealand.
- **Fine dust (PM<sub>2.5</sub>):** particles smaller than 2.5 micrometres from wood burners, vehicles, and industry penetrate deep into the lungs and bloodstream. Long-term exposure is linked to heart disease, stroke, and lung cancer.
- **Volatile Organic Compounds (VOCs):** gases from paints, cleaning products, and building materials. Short-term exposure causes dizziness and irritation; long-term exposure may contribute to respiratory illness. Levels are highest in newly built or renovated homes.
- **Radon (Rn):** a naturally occurring radioactive gas — the second leading cause of lung cancer after smoking. Higher risk areas include Otago, the West Coast, Southland, and the central North Island volcanic zones.

# 1 in 7

New Zealanders live with asthma

New Zealand has one of the highest asthma rates in the world. Poor indoor air quality — elevated CO<sub>2</sub>, mould, and fine dust — is a significant contributing factor. For children especially, the bedroom environment matters most.

## S T R U C T U R A L   R I S K

## Your Home's Structure Is at Risk Too

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The consequences of poor ventilation extend well beyond health. Moisture trapped inside a home attacks its structure over time — often invisibly, until the damage is expensive to repair.

New Zealand's 'leaky homes' crisis demonstrated this in stark terms. Trapped moisture rots timber framing, corrodes fixings, and destroys insulation. Condensation on windows drips onto sills, creating ideal conditions for mould. In ceilings and wall cavities, warm moist air meets cold surfaces, leading to hidden rot discovered only during costly structural repairs.

A Waikato University study found that homes without mechanical ventilation had **three times the rate of mould growth** compared to those with adequate airflow. Mould releases enzymes that degrade gip board and timber, slowly compromising structural integrity over time.

## N E W   Z E A L A N D   C O N T E X T

## Why Ventilation Is Especially Critical Here

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New Zealand's climate presents a combination of challenges that make effective home ventilation more important here than in many other countries:

- **High ambient humidity:** Auckland's average annual relative humidity is approximately 82%. A healthy indoor environment should sit between 30% and 50%.
- **Cold, damp winters:** temperatures regularly fall below 5°C. Combined with high humidity and rainfall, moisture accumulates rapidly indoors. Warm interior air meets cold walls and windows — and condensation forms.
- **Variable weather:** New Zealand's weather can change dramatically within a single day, making natural ventilation through open windows unreliable. On still, cold, or rainy days, windows stay closed and air quality deteriorates.
- **Limited public awareness:** ventilation is frequently overlooked in residential design — treated as an optional extra rather than an essential building system.

## M O D E R N   C O N S T R U C T I O N

## Modern Homes Are More Airtight — and That Changes Everything

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There is a common assumption that newer homes are healthier homes. When it comes to ventilation, the reality is more nuanced.

Older New Zealand homes — the villas and bungalows of earlier generations — were, by today's standards, quite 'leaky'. Gaps in floorboards, unsealed joinery, and imperfect construction allowed fresh air to enter and stale air to escape through the fabric of the building. While uncomfortable and energy-inefficient, this provided natural air exchange that helped prevent mould and pollutant build-up.

*"Modern homes are typically 5–10 times more airtight than those built in the 1970s — but that efficiency comes with a hidden cost."*

Today's homes use improved building wraps, high-quality joinery, and sealed systems that reduce heat loss and cut heating costs by 20–30%. However, those savings only apply when windows and doors stay closed.

The same airtightness that keeps heat in also traps stale air, moisture, and pollutants inside. The only way to maintain both energy savings and high indoor air quality is through **Mechanical Ventilation with Heat Recovery (MVHR)** — explored in detail in Parts 3 and 4 of this series.

#### KEY FACTS AT A GLANCE

|                             |                                                                                             |
|-----------------------------|---------------------------------------------------------------------------------------------|
| Indoor CO <sub>2</sub> risk | Sealed bedrooms can exceed 2,000 ppm overnight — more than double the safe limit            |
| Mould growth rate           | Homes without mechanical ventilation have up to 3× higher mould growth (Waikato University) |
| Asthma in NZ                | Approx. 1 in 7 New Zealanders affected — among the highest rates globally                   |
| Auckland humidity           | Average annual RH of ~82%, vs. the recommended indoor range of 30–50%                       |
| Modern airtightness         | Today's homes are 5–10× more airtight than those built in the 1970s                         |
| Energy savings              | Airtight homes can save 20–30% on heating/cooling — but only if windows stay closed         |

## COMING UP IN PART 2

**Humidity, Heating & New Zealand's Ventilation Rules**

Part 2 explores how heating and humidity interact, what the NZ Building Code and Healthy Homes Standards actually require — and why meeting the minimum may not be enough to keep your home genuinely healthy.



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