Breathe better

The plain-language ventilation guide
for building owners and property managers

How your system works | Warning signs | Maintenance | Choosing a contractor



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INTRODUCTION

Who is this guide for?

This guide is for anyone who owns or manages a building without being a ventilation engineer: owners, landlords, condominium (PPE) owners, property managers and caretakers. In about thirty minutes it explains how your system works, how to tell when it isn’t working properly, and how to talk to a contractor without being sold more than you need.

Ventilation is easy to forget because it works in the background. You only notice it when something goes wrong: condensation on the windows, a musty smell, a tenant complaining of headaches, or an energy bill that keeps climbing. By then the problem has often been building up for years.

Each chapter can be read on its own. Read the guide through once, then keep the checklist at the end for your annual inspection round.



A word from the author

My name is Atila Kardes and I founded Nordic Vent in Lausanne. I wrote this guide because most of the ventilation problems I come across could have been avoided with a little basic knowledge. If you have a question about your building, write to me: info@nordic-vent.ch

CHAPTER 1

Why ventilation matters

Ventilation has a simple job: replace stale indoor air with fresh outdoor air. When it is set up wrongly, you pay in three ways: the occupants' health, damage to the building and wasted energy.

Health

We give off CO_2 and moisture all day long. Cooking, showers, cleaning products, furniture and printers add smells and chemicals. Without enough fresh air, all of this builds up: tiredness, headaches, poor concentration and worse sleep. As a rule of thumb, indoor CO_2 should stay below about 1000 ppm; outdoor air is around 420 ppm.

The building

A family of four can release more than 10 litres of water vapour a day. If that moisture can't escape, it condenses on cold surfaces: windows, corners, behind wardrobes, inside walls. That is where mould appears and where wood and plaster slowly deteriorate.

Energy

Too little ventilation harms health, but too much costs money. Every cubic metre of warm air blown out in winter has to be replaced by cold air that must then be heated. A well-adjusted system delivers exactly the air that is needed, and modern units recover most of the heat from the extract air.

> **Why new buildings need it even more**
> Old houses let air in through gaps around windows and floorboards. Today's well-insulated, airtight buildings don't. Without working ventilation, they keep all the moisture and pollution inside.

CHAPTER 2

The four main types of ventilation

Almost every building uses one of these four solutions. Knowing which one you have is the first step to looking after it properly.

1. Natural ventilation

Air moves through vents, chimneys, gaps and open windows, driven by the wind and the temperature difference between inside and outside. No fans, no electricity. It mainly suits older, less airtight buildings. But it can’t be controlled: too much air in cold, windy weather, not enough in calm, warm weather.

2. Mechanical extract ventilation

Fans extract air from the wet rooms: kitchen, bathroom, laundry. Fresh air comes in through trickle vents in window frames or walls. Simple and cheap, this system is common in buildings from the 1970s onwards. But all the heat in the extract air is lost, and cold draughts come in through the vents.

3. Mechanical supply and extract ventilation

Separate fans blow fresh air into the living spaces and extract stale air from the wet rooms. The airflow is controlled and the incoming air is filtered, but without heat recovery this system is rare today.

4. Balanced ventilation with heat recovery

This is the supply-and-extract system with a heat exchanger in the middle. The warm outgoing air passes its heat to the cold incoming air without the two airflows mixing. Good units recover about 70 to 90 % of the heat. It is the standard in new and high-performance buildings (e.g. Minergie).

Type	Fans	Filtered air	Heat recovered	Cost	Typical building
Natural	None	No	No	Lowest	Older houses
Extract only	Extract	No	No (unless exhaust-air heat pump)	Low	Flats and houses from the 1970s on
Supply + extract	Supply + extract	Yes	No	Medium	Older commercial buildings
Balanced with heat recovery	Supply + extract	Yes	Yes, approx. 70-90 %	Highest	New builds, renovations, offices, schools

How to tell what you have
A metal box with four ducts (loft, plant room): balanced ventilation. A single fan connected to the kitchen and bathroom: extract only. No fan at all: natural ventilation.

CHAPTER 3

Inside a ventilation system

A balanced system has four airflows and a few key components. Once you can name them, a contractor’s report or quote becomes much easier to understand.

- **Outdoor air intake.** A grille on the façade or roof where fresh air comes in. It should be away from car parks, bins and the exhaust outlet.
- **Air handling unit (AHU).** The box that holds the fans, filters and heat exchanger. In a house it is the size of a fridge; in an office building it can fill a whole room.
- **Filters.** They catch pollen, dust and soot and keep the unit clean. ePM1 and ePM2.5 filters catch the finest particles.
- **Heat exchanger.** It transfers heat from the outgoing air to the incoming air. A plate exchanger has no moving parts; a rotary wheel is slightly more efficient and also recovers some moisture.
- **Fans.** Modern units use EC fans, which are energy-efficient and precisely adjustable.
- **Ducts.** Supply ducts run to bedrooms and living rooms; extract ducts come from the kitchen, bathroom and WC.
- **Silencers.** Insulated duct sections that stop fan noise from reaching the rooms.
- **Supply and extract valves.** The round or square terminals in ceilings and walls, each set for a specific airflow. Turning them changes the balance of the whole system: leave them alone.
- **Controls.** A display or app for speed, schedules and alarms, often with a boost button and a filter-change alarm.
- **Exhaust outlet.** Where the stale air leaves the building.

The four airflows

Airflow	From	To	What happens
Outdoor air	Outside	The AHU	Filtered, then warmed in the heat exchanger
Supply air	The AHU	Bedrooms, living room	Fresh, filtered and pre-warmed air
Extract air	Kitchen, bathroom, WC	The AHU	Gives its heat to the incoming air
Exhaust air	The AHU	Outside	Stale, cooled air leaves

CHAPTER 4

Signs your ventilation isn’t working properly

Most problems show up as small annoyances long before anything breaks down. If you notice two or more of these signs, have the system checked.

What you notice	Likely cause	First thing to do
Condensation on the windows every morning	Not enough extract air, or system off / on low speed	Check the unit runs at normal speed; clean the extract valves
Black mould spots in corners or the bathroom	Moisture building up over time	Treat the mould, then have the airflows measured
Stuffy air, headaches, tiredness	High CO_2, not enough supply air	Check the filters; measure CO_2 overnight in the bedroom
Musty or stale smell	Dirty filters or ducts, or a damp unit	Change the filters; ask for an inspection if the smell persists
Cooking smells spread	Weak kitchen extract or faulty boost	Clean the cooker hood filter; test the boost function
Cold air dropping from ceiling valves	Heat exchanger frozen, bypassed or faulty	Read the alarms on the display; call a technician
Whistling, humming, vibration	Clogged filters, worn bearing, valves out of adjustment	Change the filters; don’t adjust the valves yourself
Doors slam or are hard to open	System out of balance (pressure difference)	Have the airflows measured and rebalanced
Filter alarm won’t clear	Not reset after the change, or wrong filter	Reset as per the manual; check filter size and class
Energy bill rising for no clear reason	Fans stuck on high speed, heat recovery not working	Check settings and schedules; book a service

A simple, cheap test
A plug-in CO_2 sensor costs about as much as a takeaway meal. Put it in a bedroom overnight with the door closed. If it regularly goes well above 1000 ppm by morning, the room isn’t getting enough fresh air.

CHAPTER 5

Maintenance: what you can do and what needs a professional

A ventilation system needs very little attention, but it does need some. Most tasks take a few minutes and no tools.

What you can do yourself

- **Change the filters.** Usually every 6 to 12 months; more often in town or near a busy road. Buy exactly the size and class specified, write the date on the frame and reset the alarm.
- **Clean the extract valves.** Take them off, wash them in warm soapy water, dry them and refit them in exactly the same position. Mark the setting with a pencil first.
- **Clean the cooker hood grease filter.** Once a month, or in the dishwasher.
- **Check the outdoor grilles.** Remove leaves, snow, cobwebs and nests.
- **Listen and look.** A new noise, an alarm on the display or water under the unit are reasons to call.

What needs a professional

- **Servicing the unit:** fans, heat exchanger, condensate drain and controls, usually every 1 to 2 years.
- **Airflow measurement and balancing:** after building work, or if some rooms are poorly ventilated.
- **Duct cleaning:** usually every 5 to 10 years, depending on the building and filter quality.
- **Mandatory inspections:** depending on the canton and type of building, inspections may be required, especially for apartment buildings, schools and offices. Ask your contractor what applies to your building.

A simple annual schedule

When	Task	Who
Every month	Clean the cooker hood filter	You
Every 6 months	Check the outdoor grilles; check the unit’s alarms	You
Every 6 to 12 months	Change the filters; reset the alarm	You
Every year	Clean all supply and extract valves	You
Every 1 to 2 years	Service the air handling unit	Technician
Every 5 to 10 years	Duct cleaning and full airflow check	Contractor

CHAPTER 6

Energy and running costs

You can usually cut a system’s running costs without making the air worse. The trick: match the airflow to the times the rooms are actually in use.

- **Use schedules.** Offices and schools can run at low speed at night and at weekends. A home needs continuous ventilation day and night, but not on boost.
- **Don’t switch it off.** Turning off the ventilation in a home to save money invites condensation and mould, which cost far more to fix.
- **Keep the filters clean.** Clogged filters make the fans work harder and use more electricity.
- **Check the heat recovery.** If the supply air is cold in winter, the heat exchanger may be bypassed or faulty, and you are paying to heat outdoor air.
- **Demand-controlled ventilation where it makes sense.** CO_2, humidity or presence sensors raise the airflow only when needed. They pay off mostly in meeting rooms, classrooms and offices.
- **Replace old fans.** Switching from old AC fans to EC fans often cuts their electricity use significantly.

> **Rule of thumb**
> In a building with heat recovery, ventilation is rarely the biggest energy item. Without heat recovery, the heat lost with the extract air can be one of the largest items on the heating bill.

CHAPTER 7

Renovating or installing a new system

A system is usually replaced during a renovation, when the old unit fails, or when moisture problems won’t go away. These are the decisions you will face.

Repair or replace?

A unit under about 15 years old with a single faulty part is usually worth repairing. An old unit without heat recovery, noisy and with parts no longer available, is usually worth replacing: the energy savings help pay for the new one.

Central or room by room?

A central ducted system gives the best air quality and efficiency, but it needs space for ducts. In flats and renovations where ducts are hard to run, decentralised units fitted in the wall of each room can be a good compromise. They are quicker to install, but noisier and less efficient.

Things to plan for

- **Space.** The unit must be accessible for servicing and filter changes, not just fit in.
- **Duct routes.** Through suspended ceilings, cupboards and boxing-in; often the trickiest part.
- **Noise.** Ask for the expected sound level in bedrooms, and insist on silencers.
- **Condensate.** Balanced units produce water and need a drain.
- **Permits.** New façade grilles or roof penetrations may need approval (municipality, PPE owners’ meeting).
- **Commissioning.** Airflows must be measured and balanced at handover, with a written report. The Swiss references are the SIA 382/1 standard and, for housing, the SIA 2023 technical bulletin.

CHAPTER 8

Choosing a contractor and reading a quote

A good contractor explains what they will do, why, and what you will have at the end. Use these questions to compare quotes fairly.

Questions to ask

- What airflow will each room get, and how did you calculate it?
- Which unit and heat exchanger will you install, and what is its heat recovery efficiency?
- What sound level should I expect in the bedrooms?
- Are airflow measurement and balancing included, with a written report?
- What does the warranty cover, and for how long?
- What will annual maintenance cost, and where can I buy filters?
- Who removes the old equipment and repairs walls and ceilings?

What a good quote includes

Item	What to check
Equipment	Make and model of the unit, fans and valves, not just “ventilation unit”
Ductwork	Approximate length and sizes, insulation where ducts pass through cold areas
Labour	Installation, electrical connection, condensate drain
Commissioning	Airflow measurement, balancing and handover report
Associated work	Openings, boxing-in, painting: included or excluded?
Exclusions	A clear list of what is NOT included
Timing and payment	Start date, duration of the work and payment schedule

Warning signs
A price with no breakdown. No mention of measurement or balancing. Pressure to sign the same day. A price far below all the others with no explanation. Each of these is a reason to ask more questions before you sign.

QUICK REFERENCE

Annual inspection checklist

- [ ] The unit is running and shows no alarms
- [ ] Filters changed within the last 12 months, date noted
- [ ] Kitchen, bathroom and WC extract valves are clean
- [ ] Outdoor grilles are clear
- [ ] No condensation on the windows on a normal morning
- [ ] No mould in corners or in the bathroom
- [ ] No new noises from the unit or the valves
- [ ] Supply air is not cold in winter
- [ ] Cooker hood filter clean and boost working
- [ ] Last professional service less than 2 years ago

Glossary

Term	Meaning
AHU	Air handling unit: the box with the fans, filters and heat exchanger
CO_2	Carbon dioxide; a good indicator of whether a room gets enough fresh air
EC fan	Energy-efficient fan with finely adjustable speed
Extract air	Stale air taken from the kitchen, bathroom and WC
Balanced ventilation	Ventilation with supply, extract and heat recovery
Extract only	Ventilation by extraction alone
ePM1 / ePM2.5	Filter classes for fine particles
Balancing	Setting each valve so every room gets its design airflow
Supply air	Fresh, filtered air blown into the living spaces
PPE	Propriété par étages (Swiss condominium ownership)
ppm	Parts per million; the unit used to measure CO_2

This guide gives general information. Rules and requirements vary by canton and type of building; for your building, always consult a qualified ventilation professional.

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Want an expert view on your ventilation?

Nordic Vent supports owners, condominiums (PPE), property managers, architects and contractors in western Switzerland: advice, service, filters and Eurovent-certified air handling units.

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