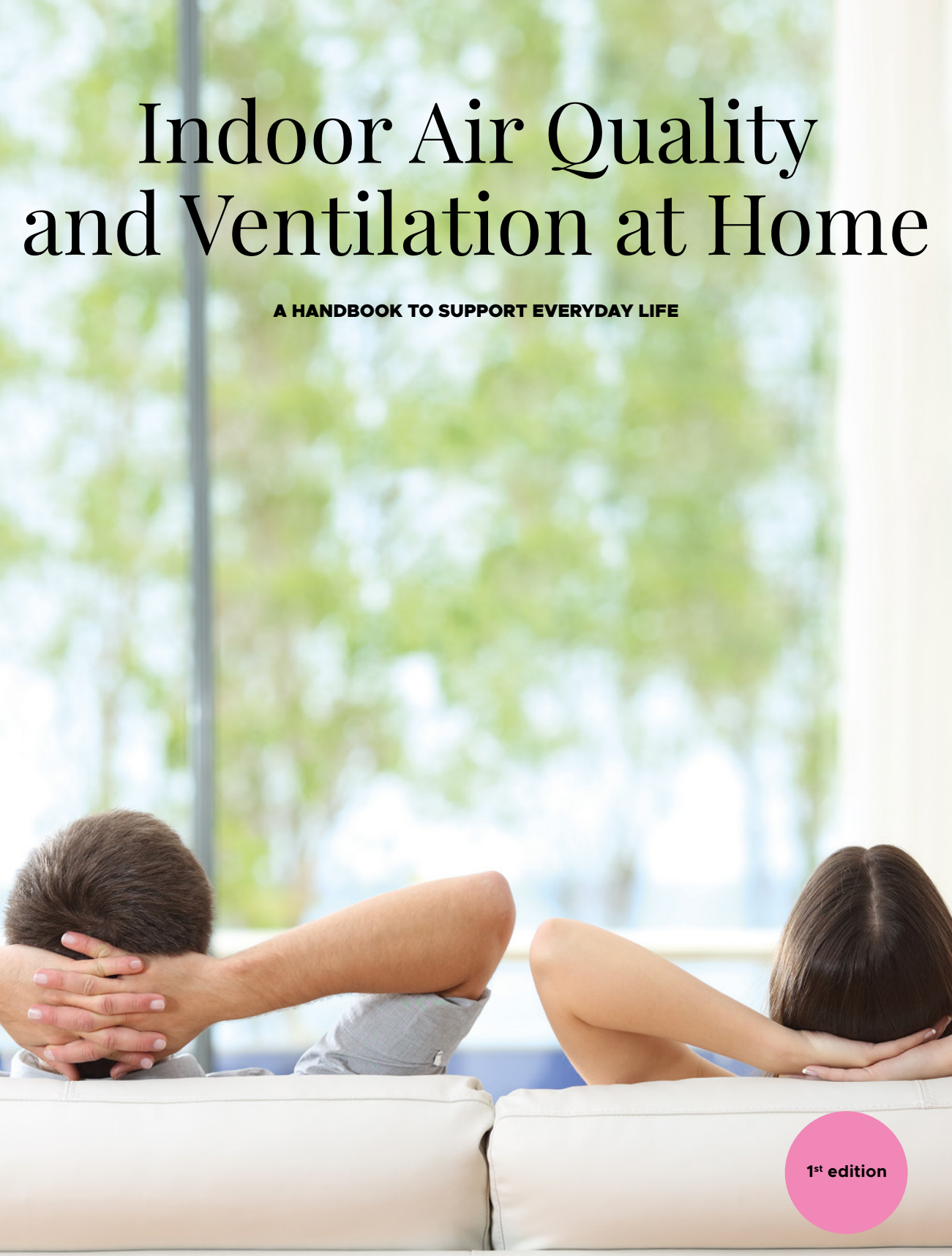
Indoor Air Quality and Ventilation at Home

A HANDBOOK TO SUPPORT EVERYDAY LIFE



1st edition

The Organisation for Respiratory Health in Finland promotes respiratory health and good life for people suffering from respiratory diseases.

The Organisation for Respiratory Health in Finland

In this guide, you will find concise information about the indoor air quality and ventilation of residential buildings. The quality of the air we breathe matters. One person breathes in roughly 15,000 litres of air per day. People spend a large part of their day indoors, which further highlights the importance of the quality of indoor air.

Indoor air quality affects our comfort, health, well-being, and work efficiency. A healthy indoor environment should be as odourless, noiseless, and dust- and draught-free as possible, and it should be at a pleasant temperature.

For more information about moisture damage and its health effects, see our guide "Water damage at home and your health".

CONTENTS:

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The Organisation for Respiratory Health in Finland

1 Factors that affect indoor air quality

Indoor air quality consists of many different elements. The cornerstone of good indoor air quality is proper ventilation. The factors that affect indoor air quality include:

- temperature
- draught
- humidity
- cleanliness
- gaseous pollutants and particulate matter that form indoors or come from outside
- emissions from construction and interior decoration materials
- moisture damage and mould.

Properly planned and executed construction work, regular building maintenance, and the use of low-emission materials are factors that can also significantly improve the quality of indoor air. It is important to avoid smoking indoors. Naturally occurring radon gas should be prevented from entering indoors.

Indoor air quality issues can be prevented. It is advisable to monitor the condition of the building's structures and systems regularly. Particular attention should be paid to areas that are exposed to moisture. Proactive building maintenance helps create cost savings and prevent health and comfort issues. Any problems should be fixed immediately when the need arises.

2 Ventilation

The key to fresh and healthy indoor air is a properly functioning ventilation system. The purpose of ventilation is to remove gaseous pollutants, particulate matter, and humidity from indoor air and to replace stale air with fresh outside air.

Pollutants include odours and dusts emitted by humans and human activities, pets, construction and interior decoration materials, textiles, goods, and detergents.

In a residential building, the ventilation system should introduce fresh air through supply or make-up air vents to living areas such as bedrooms, living rooms, and home offices. Stale air is removed through exhaust vents located in the apartment's kitchen, toilet, bathroom, and walk-in closet.

It is important to ensure that the air can flow from one room to another inside the apartment. What this means in practice is that there should be a small gap of roughly 2 centimetres between all interior doors and thresholds to ensure that the air can circulate freely even when the doors are closed. If possible, you can also keep the interior doors open. Alternatively, you can install a transfer grille on the door or door frame where possible.

2.1 How ventilation works at home

In residential buildings, the purpose of ventilation is to remove pollutants generated by, for example, construction and interior decoration materials, textiles, and detergents, and bring in fresh outside air. Home ventilation should always be running at the minimum setting specified in the ventilation plan, regardless of whether the occupants are at home or not.

The ventilation systems of apartment blocks usually have dual speed fans that

run at full speed at the time when people usually cook at home: in the morning and evening, for four to eight hours a day in total. At other times, the fans run at half capacity.

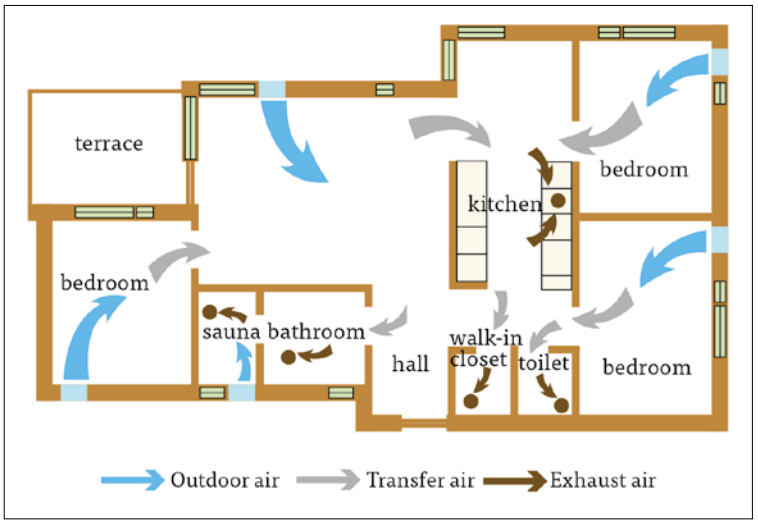
If you suspect that your ventilation may not be working properly or consistently, you should contact the property manager or the building maintenance company. If your apartment feels stuffy all the time, you should address the ventilation times in a housing company meeting. Boosting the ventilation early in the morning is one way to fix stale air.

New apartment blocks often feature individual apartment ventilation units to enable you to adjust the ventilation of your apartment yourself. Some new ventilation solutions control and adjust the apartment's ventilation automatically with the help of humidity and CO_2 sensors.

2.2 How to identify ineffective ventilation

The ventilation rate is sufficient when the air is changed approximately every two hours. The only completely reliable way to estimate the ventilation rate is to conduct measurements. The general rule of thumb is that a mechanical ventilation system is effective enough if an A4 paper sheet sticks to the exhaust air vent. If humidity makes your bathroom mirror foggy for more than 5–10 minutes after you take a shower, the bathroom ventilation is not effective enough.

A musty smell is usually a sign of inadequate ventilation. If your bedroom feels



Airflows inside an apartment with a natural ventilation system and a mechanical exhaust ventilation system.

stuffy in the morning, it could be a sign that your ventilation is ineffective or that the flow of air from the supply vent to the exhaust vent is blocked.

If opening the front door is difficult or if there is a strong current coming through the mailbox, there is negative pressure in the apartment. This means that there is not enough make-up air coming into the apartment or the ventilation settings are incorrect. If the residential building has a natural ventilation or mechanical exhaust ventilation system, the issue can be fixed by installing filtered make-up air vents (if they do not already exist) in the building's exterior wall, the wooden ventilation panels in windows, or the window frames, or between the window frame and the wall.

If both supply and exhaust ventilation are fully mechanical, the supply and exhaust airflow rates should be measured and adjusted to meet the plan.

2.3 Different types of ventilation systems

Ventilation can be either natural or mechanical. If the supply air is processed by, for example, cooling it, it is called air conditioning. Cooling is especially useful in the summer.

2.3.1 Natural ventilation

Natural ventilation is based on pressure differences between indoor and outdoor air created by temperature and wind. The problem with natural ventilation is that the flow of air tends to vary depending on the weather conditions. Natural ventilation is most efficient when the weather is cold and windy, whereas in warm and windless weather, it can be almost non-existent. Sometimes the air may flow in the wrong direction in the exhaust duct, leading to odour and dust problems indoors.

Make-up air vents bring fresh air into the apartment. They are located in the external walls, window frames, or wooden ventilation panels in windows. **Exhaust vents** are often located in kitchens, toilets, bathrooms, and walk-in closets.

Properly functioning natural ventilation requires large enough supply air vents in all living areas. If there are no supply air vents, they should be installed. We recommend using vents that have filters.

You should also check that there are routes for the air to flow from the supply air vents to the exhaust vents.

The length of the exhaust flue affects ventilation: the taller the flue, the better the conditions for a properly functioning ventilation. The ventilation rate can be improved by installing wind-powered roof fans at the end of the exhaust duct. Today, there are also **assisted ventilation systems** in which natural ventilation is assisted by fans to improve the flow of air. Fireplaces improve the circulation of air in naturally ventilated spaces.

In Finland, natural ventilation was the almost exclusive ventilation method used in residential buildings until the 1960s. Nowadays, natural ventilation is no longer the preferred option, as it does not always provide enough ventilation in all rooms. Natural ventilation is not an energy-efficient solution: as it does not allow heat recovery from the exhaust air, it causes heat loss.

2.3.2 Mechanical exhaust ventilation

Mechanical exhaust ventilation uses fans to remove stale air from indoors. Apartment blocks usually have a roof extractor or an extractor air fan and cooker hood in the kitchen.

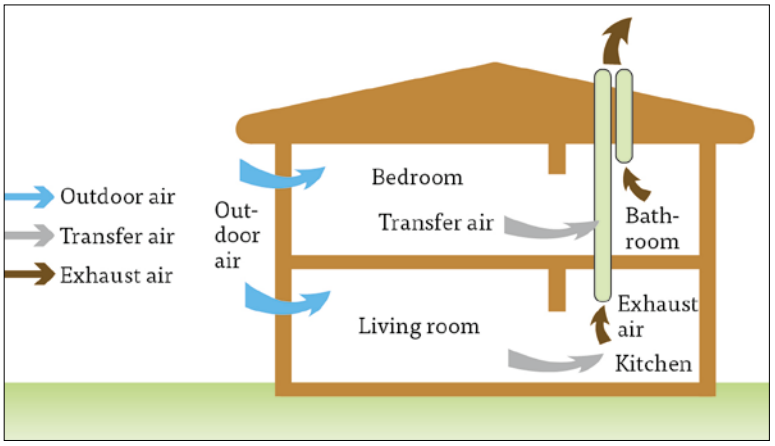
Fresh air is usually drawn in through supply air vents. Weather conditions have no effect on airflows in a mechanical exhaust ventilation system. Airflows can be boosted and reduced by adjusting the extractor fan speed. Compared to natural ventilation, the ventilation rate is more consistent and the air changes more efficiently in hot summer weather.

A common problem with mechanical exhaust ventilation is insufficient supply of make-up air from outside. Make-up air vents are often too few, or they are shut or do not exist at all, in which case fresh air is drawn in through cracks and leaks in the building's envelope.

If you do not already have make-up air vents, they should be installed. We recommend using vents that have filters. The best option is to install vents in exterior walls or the wooden ventilation panels on windows. The vents can also be mounted on window frames or between the frame and wall. You should also check that there are routes for the air to circulate from one room to another.

In residential apartment blocks, mechanical exhaust ventilation is implemented using a central duct system. Since the exhaust air ducts and equipment are shared, the occupants cannot adjust the ventilation on their own.

Natural ventilation



In detached houses and terraced houses, the exhaust fan control is on the cooker hood, enabling the occupants to adjust the efficiency of ventilation themselves.

In Finland, mechanical exhaust ventilation systems became common in the 1960s and were used in residential buildings until the 1990s. Mechanical exhaust ventilation is not an energy-efficient system: most of the heat is released outside through exhaust vents if no heat recovery system has been installed. Because it does not heat the fresh air that comes from outside, mechanical exhaust ventilation system can cause a draught. Draught issues can be avoided by installing vents that heat the supply air.

2.3.3 Balanced mechanical ventilation

Today, almost all residential buildings in Finland have a balanced mechanical ventilation system. A balanced ventilation system mechanically pulls in fresh outside air and removes stale inside air. The advantage of this system is that the airflows can be adjusted to ensure a consistent circulation of air.

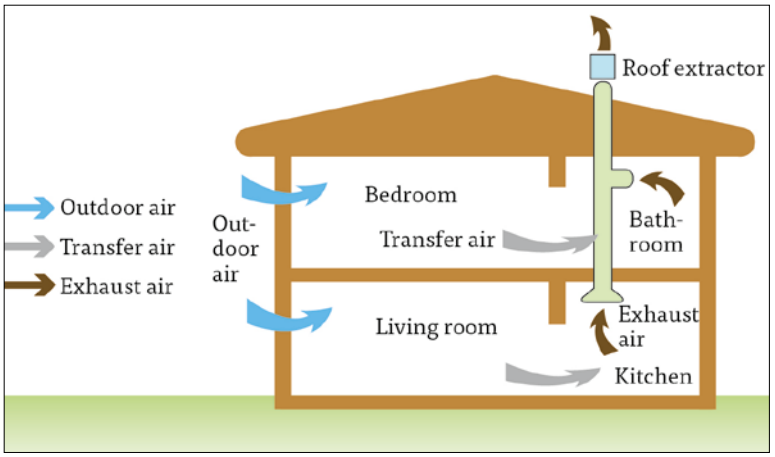
The supply air can be heated and filtered before it enters the room. The system has a heat recovery device that uses the thermal energy recovered from the exhaust air to heat the supply air, which makes this an **energy-efficient option**. The temperature of the supply air should be a few degrees below room temperature.

The ventilation unit has a filter to filter the incoming air. Filters are an effective way to prevent street dust and pollen from entering your home.

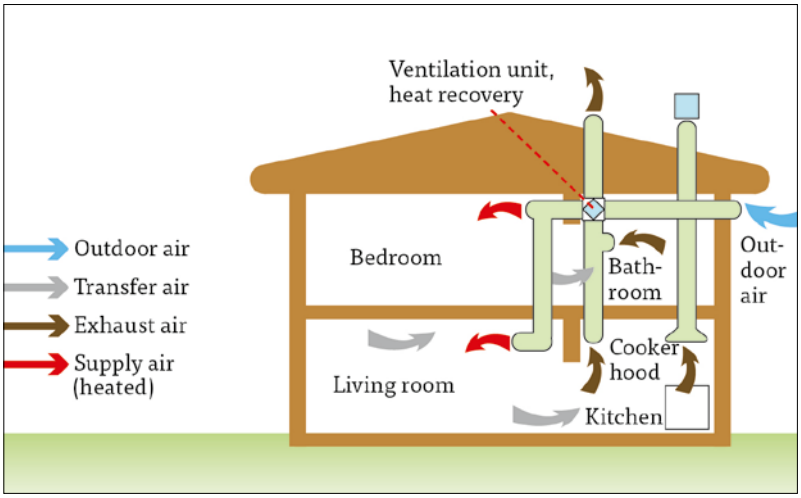
Apartment blocks and terraced houses have balanced mechanical ventilation systems with either central ventilation units or individual apartment ventilation units. **An individual apartment ventilation system** means that each apartment has its own ventilation unit to enable occupants to adjust the settings as needed.

Today's buildings have tight envelopes, which means that balanced mechanical ventilation is the most reliable option for ensuring adequate and controlled ventilation in all rooms. As with any other ventilation system, the circulation of air from one room to another must be ensured. With balanced mechanical ventilation, it is important to invest in a ventilation unit of the right

Mechanical exhaust ventilation



Balanced mechanical ventilation



size, a good sound reduction system, and a proper commissioning process.

2.4 Operating the ventilation system

Good indoor air quality requires the correct use and regular maintenance of the building and its equipment. The ventilation system must be running even when there is no one in the apartment. **The ventilation unit must be running at all times with the vents open.** This prevents the harmful build-up of impurities and humidity indoors.

It is unwise to try to save energy by compromising ventilation: poor ventilation reduces the quality of indoor air, leads to health problems and discomfort, and increases the risk of moisture damage.

2.4.1 Boosting ventilation

Whenever significant amounts of moisture and impurities are generated in the apartment, be it due to cooking, showering, sauna bathing, or cleaning, it is necessary to boost the apartment's ventilation. The ventilation of wet rooms should be boosted after use until the room is dry.

With a mechanical ventilation system, ventilation can be improved by switching it to a higher setting. Natural ventilation can be enhanced by opening the windows. You can also use window ventilation to briefly boost ventilation even if your home has a mechanical ventilation system. If the ventilation system is automated, this may change the system's settings temporarily. The settings will gradually go back to normal after you close the windows.

All rooms should have a window that can be opened. To prevent dust and particles from entering indoors, you can install filter fabric in your ventilation windows.

The most energy-efficient way to air out a room or an apartment is to **create a draught** by opening as many windows and doors as possible at the same time. Giving the room a brief, good airing changes the air quickly, and the windows and doors can be closed again. If you need to keep your windows constantly open to get fresh air, it means that the ventilation system is not working properly or efficiently enough.

2.4.2 Ventilation equipment maintenance

To achieve properly functioning ventilation, the exhaust and supply airflows should be adjusted according to ventilation plans and needs. Do not try to adjust or block the vents by yourself. In apartment blocks and terraced houses, occupants are not allowed to make any changes to the ventilation system without the permission of the housing company.

The ventilation system needs to be cleaned. **Maintain and clean the ventilation equipment according to the manufacturer's instructions.** Before a new building is commissioned, the ventilation ducts should be checked and cleaned as needed. The airflows should be measured and readjusted a couple of years after the building was commissioned. In residential buildings, the ventilation ducts should ideally be cleaned every five to eight years or at least every ten years. After cleaning, the airflows should be checked and readjusted. In apartment blocks and terraced houses, the cleaning and adjustment of ventilation ducts is the housing company's duty.

If the apartment's ventilation system has **filters**, they should be replaced or cleaned at least twice a year or according to the manufacturer's instructions. In apartment blocks and terraced houses, the replacement and cleaning of filters is primarily the housing company's responsibility. Housing companies can ensure that filters are changed regularly by handing over the task to a building maintenance company.

Vents located inside the apartment **should be cleaned by the occupant.** Exhaust vents should be cleaned at least twice a year. Dusty vents make ventilation less effective. Vents should be cleaned according to the manufacturer's instructions. Some vents can be detached and then wiped or washed. Vent settings should not be changed.

The grease filter of the cooker hood should be cleaned or replaced approximately every three months. Cleaning the cooker hood filter is the responsibility of the occupant but replacing it is usually the housing company's duty.

2.4.3 Costs of ventilation system renovation

It is possible to install a balanced mechanical ventilation system afterwards.

Installing a balanced mechanical ventilation system in an old building leads to additional renovation costs. Cost-wise, it is best to carry out the ventilation system renovation at the same time as the overall renovation of the property. Particular attention should be paid to the tightness of the building's envelope. A tight building envelope ensures that outside air is not seeping in through the building's structures.

To ensure that the ventilation works properly, it is best to get a professional ventilation designer involved in the process.

2.4.4 Savings through heat recovery

Heat recovery enables the efficient transfer of heat from the warm exhaust air to the cool supply air. The efficiency of the most powerful heat recovery systems can be over 80%.

The electricity consumption of ventilation fans accounts for a very small percentage of the apartment's total energy consumption. In a small terraced house or apartment block, the energy consumption of ventilation fans is around 30 watts and in a medium-sized detached house around 50 watts.

2.5 Solutions to common ventilation issues

Common ventilation issues include transfer of odours, draughts, noisy ventilation equipment, ineffective ventilation in wet rooms, and spread of dust indoors.

2.5.1 Odour transfer

Smells from food and tobacco smoke can find their way into the apartment through the stairwell and letterbox. Odours can spread from one apartment to another through structures, cracks and leaks in ventilation ducts, and unsealed pipe penetrations between apartments.

The problem can be fixed by balancing the ventilation system's airflows, ensuring an adequate and direct supply of fresh outside air into each apartment, and sealing any potential leaks.

It is also a good idea to check that the neighbour's cooker hood fan has not been connected to the building's main duct. Cooker hoods can spread odours to other apartments through the main duct of the building's ventilation system.

2.5.2 Draughts

A draught is usually associated with a high current of air. However, it can also be caused by low air temperature, leaks in the building's envelope, and the movement of air caused by large cold surfaces, such as windows. Draughts can also be caused by a wrong supply airflow direction.

Supply air should be heated to prevent cold airflows. This is possible if you have a balanced mechanical ventilation system.

If you have a mechanical exhaust ventilation system, fresh and draught-free indoor air can be achieved with the help of heating make-up air vents.

Do not close any vents. If you close or seal the supply vents, the ventilation will become ineffective and make-up air will be pulled in through the building's shell.

2.5.3 Noise from the ventilation system

Ventilation systems may cause disturbing noise. The noise may be caused by fans, the flow of air in the ventilation ducts, or the vibration of ventilation equipment. A common problem is that the ventilation unit is too small, in which case the unit has to be run at a high setting, creating noise.

Noise can be prevented during construction by choosing a ventilation unit with a high enough capacity, by choosing the right ducts, duct parts, and equipment and sizing them correctly, and by soundproofing the system where necessary.

Soundproof vents and correctly adjusted airflows also help reduce noise. Air leaks and structure-borne noise can be fixed by sealing and insulating the structures.

2.5.4 Wet room ventilation

The use of wet rooms, such as bathrooms and saunas, always generates moisture. Moisture can damage the structures if the surfaces do not dry quickly enough after use.

The best way to prevent moisture from entering the structures is proper waterproofing. The rooms should also have proper ventilation and heating. The ventilation should be powerful enough during use to allow the water vapour to get out of the room, avoiding condensation on cool surfaces. Underfloor heating is recommended for wet rooms, as it allows the floors to dry faster. The underfloor heating should be designed so that it can also be kept on during the summer.

Ventilation cannot fix existing moisture damage and mould problems. The cause of moisture damage should always be investigated. Damaged materials should be removed and the structures repaired.

2.5.5 Spread of dust indoors

Hardware stores and online shops sell filter fabric for ventilation windows to reduce the spread of dust indoors.

Fine-particle filters keep out not only coarse particles, such as pollen and street dust, but also a substantial percentage of the fine particles created by domestic wood burning and traffic.

If your ventilation window already has a mosquito net screen, you can easily attach filter fabric to it with double-sided tape. You can also build a frame for the filter fabric yourself.

The filter should be replaced at least twice a year and whenever it gets wet.

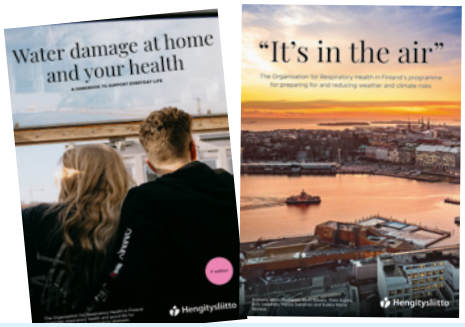
3 Structural dampness

The building's structures are constantly exposed to external and internal sources of moisture. Rainwater puts a strain on the building's roofs and walls. Foundations and basements are exposed to soil moisture, surface water, and rainwater dripping down from the roof.
Structures may have moisture in them from construction or from pipe and sewer leaks.

The normal use of the building, such as showering, cleaning, cooking, and doing the laundry, increases indoor humidity. If the ventilation is not working properly, condensing humidity may damage the structures. A positive pressure ventilation system can push the indoor humidity into the exterior walls.

Monitoring and maintaining the home and its systems regularly, as well as repairing structures that are at the end of their service life in time, can prevent indoor air problems, moisture damage, and mould.

For more information about preventing, investigating, and repairing moisture damage, see our guide "Water damage at home and your health". You can also read our climate and weather programme "It's in the air" for more detailed information about the effects of climate change on our health and homes.



3.1 Moisture damage and mould

Mould growth is caused by structural dampness. Moulds and other microbes need humidity, nutrients, and warmth to grow. All buildings already provide the warmth and the nutrients: construction materials, dust, and dirt. **Humidity is the only factor that can be controlled.**

Mould spores are practically everywhere. They start growing when the conditions are right. Organic materials, such as wood, are particularly good food for mould growth. Mould growth can, however, also occur in nutrient-poor environments and surfaces, such as bricks, concrete, or even steel.

3.1.1 How to detect moisture damage and mould

Signs of moisture damage and mould growth include materials coming apart, peeling paint, blisters or bubbles in wallpaper, swollen building boards, changes in the colour of a surface, and the darkening of parquet, vinyl flooring, and plastered surfaces. Sometimes mould growth is visible to the eye.

A musty, earthy, or clearly mouldy smell can be a sign of moisture damage and mould growth. **The smell may be present all the time or it may occur only occasionally.** The occurrence of the odour may vary depending on the season or pressure variations in the ventilation system.

Moisture damage and mould growth cannot always be seen or smelled clearly. In this case, the only way to identify the problem is to carry out a thorough structural inspection. Read more in our handbook "Water damage at home and your health".

The Hometalkoot.fi website offers practical information (in Finnish) on building maintenance, risk-prone structures, and the prevention of water damage and mould growth. The site serves the owners of properties and apartments, as well as those responsible for the maintenance of buildings or those considering the purchase of a home.

HOME TALKOOT.FI
Terveiden talojen puolesta

4 Temperature and humidity

People perceive temperature differently. Some prefer a cool room temperature, others warm. Our perception of temperature is affected not only by the room temperature but also by humidity, clothing, type of activity, thermal radiation, and airflow velocity.

If the temperature is too low or too high, it can make the place less pleasant to live in. It can also lead to health problems.

A good indoor temperature is around 20°C–22°C. The floor temperature should be at least 18°C.

If the temperature is too high, it can lead to higher levels of emissions from construction and interior decoration materials.

If the temperature is much higher than recommended, the indoor air tends to get dry and stuffy. This can lead to various symptoms, such as fatigue and irritation of the skin, eyes, and mucous membranes.

High indoor temperatures also interfere with the quality of sleep. The bedroom temperature can be slightly lower than the recommended room temperature of 20–22°C. People usually find cool indoor air easy to breathe because of its humidity. However, if the temperature is too low, it can lead to draughts and cause muscle and joint pain.

In spring and summer, the indoor temperature may rise too high due to solar radiation. You can prevent this by blocking sunlight with curtains, window films, or awnings and by boosting your apartment's ventilation at night. Air source heat pumps can be used to cool indoor air in hot summer weather.

The indoor humidity level varies depending on the season and weather conditions. In the summer, the relative humidity of indoor air varies between 50% and 70%, depending on the humidity of the outside air. In the winter, indoor air is almost always dry, the relative humidity being below 40%. In freezing weather, the relative humidity of indoor air can sink below 20%.

Dry indoor air is a normal wintertime phenomenon, so there is not much you can do about it. The dryness is more noticeable in places with powerful ventilation. High indoor temperatures also increase dryness.

If the air inside your apartment is too dry, you can bring the temperature down a notch. This helps increase the relative humidity of air.

Humidifiers are an easy way to add moisture to the air. When you use a humidifier, you should monitor the humidity level with an air humidity meter. When the relative humidity of inside air exceeds 40% during the heating season, you should stop using the humidifier.

Sometimes humidifiers can make the indoor air too humid. Excessive humidity can cause condensation of water vapour on cool surfaces, such as windows and exterior walls. At worst, this can lead to moisture damage.

Poorly maintained humidifiers can spread microbes in indoor air, which is why you should keep your humidifier clean. Do not let water sit in the humidifier for a long time. Always follow the user and maintenance instructions carefully. A warm-mist humidifier is the most hygienic option.

To prevent microbial growth inside and on the surfaces of structures and equipment, the indoor humidity level should not be too high for long periods of time. If the indoor humidity level exceeds 45% during the heating season, the root cause is usually ineffective ventilation or human activity, such as cooking or doing the laundry.

The relative humidity of indoor air has an impact on respiratory health. Dry indoor air causes and increases irritation of the airways, eyes, and skin.

5 Particulate matter, fibres, and allergens

Particle pollution and dust, such as pollen, street dust, and soot particles from residential wood burning, can enter indoor air from outside and cause indoor air problems and symptoms.
Pollutants can be prevented from entering indoors by supply vent filters.

Indoors, particle pollution is generated by human activity, such as cooking, smoking, candle burning, and cleaning. Apartments may also have pet dander, which can cause allergies.

Particulate matter concentrations can be decreased with good ventilation and the right cleaning methods. For more everyday tips, read our guides on clean wood burning and fine particles.

Indoor air may also contain particles and fibres from construction and interior decoration materials, such as **mineral wool and asbestos fibres**.

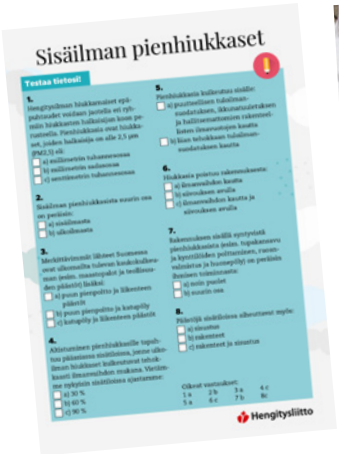
Materials containing mineral wool are used in thermal insulation and fire protection, stud wall insulation, acoustics tiles, and ventilation system insulation and soundproofing.

If mineral fibres are detected in indoor air, the source must be identified, and the fibres must be prevented from entering indoor air. Mineral wool products may start to break down over time. The issue can be fixed by replacing the insulation wools, sealing the structures, or replacing the soundproofing.

Mineral fibres cause irritation of the eyes, skin, and mucous membranes.

Asbestos is a fibrous mineral that is harmful to health when inhaled. **Asbestos-containing products that are intact and dust-free do not pose a health risk.** Damaged asbestos-containing materials should be removed if there is a risk that they could release asbestos fibres into the air.

The law requires that all buildings constructed before 1994 must undergo an asbestos survey before renovations or repairs. For more information on asbestos and its health effects, read our guide “Asbestos & Respiratory Health”.



6 Gaseous pollutants

Gaseous pollutants that occur in indoor air originate from the building itself, humans and human activity, pets, soil, and outdoor air.

6.1 Odours

Strong odours can originate from various sources. A persistent and unpleasant smell inside the building often points to indoor air problems. The source of the smell should be identified and eliminated. **Bad odours make the place less pleasant and can, at worst, be harmful to health.**

Sources of unpleasant odours include mould growth and construction and interior materials. A sewer smell can be caused by a dirty, defective, or dry floor drain water trap or a poorly sealed drainpipe connection.

Harmful odours that come from outside include traffic exhaust and liquid fuel smells.

Other sources of strong odours include detergents and fragrances used by occupants. For more information on odours, fragrances, and fragrance sensitivity, visit the website of the Organisation for Respiratory Health in Finland.

Odours can also enter your home from your neighbour's apartment through the front door, letterbox, open windows, structures, or leaks and cracks in ventilation ducts. Sometimes odours enter your home through ventilation or the structures that separate apartments. This problem can be fixed by sealing any cracks and leaks in the structures and by balancing the ventilation system's airflows.

6.2 Volatile organic compounds (VOCs)

Indoor air may contain hundreds of volatile organic compounds or VOCs, usually in low concentrations. At home, sources of VOCs include construction and interior decoration materials, detergents and cleaning products, textiles, cosmetics, combustion gases, tobacco smoke and, in some cases, microbial growth and outside air.

All construction and interior decoration materials release VOCs into indoor air. The VOCs released by construction materials come from solvent and raw material waste, and the reaction and breakdown products of manufacturing processes. New materials have the highest VOC

*VOC = volatile organic compound

concentrations. The VOC content of indoor air can be reduced by window ventilation and by boosting the ventilation settings.

As the materials become worn down over time or are exposed to humidity and high temperatures, they may release more VOCs into the air.

Avoid using materials that have a strong, unpleasant smell. The smell may be a sign of a health risk**. The materials used in construction and interior decoration should be low-emission, M1-classified materials.**

There are no zero-emission construction or interior decoration materials. However, the M1 classification of the Building Information Group guarantees that the product is low-emission when used in accordance with the manufacturer's instructions.

Low-emission means that the product's emissions do not exceed the limit values in laboratory tests. These laboratory tests measure the amount of gaseous pollutants, such as ammonia and formaldehyde, released into the air from the material. M1 testing also includes a sensory analysis of the product's odour.

The certification can be given to ventilation products, construction materials, fixtures, fittings, and paints. Read more about the classification of low-emission products at cer.rts.fi/en/.

6.3. Carbon dioxide

Carbon dioxide mainly comes from outside. Indoors, the main source of CO_2 is exhalation. High indoor CO_2 levels usually indicate that the ventilation is inadequate for the number of people in the room or apartment. The amount of CO_2 can be reduced by boosting ventilation.

High CO_2 levels make the air stale and cause fatigue, headaches, and difficulty concentrating.

6.4 Carbon monoxide

Carbon monoxide is generated by the incomplete combustion of substances that contain carbon.

Outdoors, carbon monoxide originates from traffic. Indoors, it is generated by poorly functioning fireplaces, gas stoves, and smoking. When using a fireplace or gas stove, make sure that the fire is getting enough air for combustion and that the combustion gases are removed outside. Do not close the damper of the fireplace until the embers have gone out

completely. The formation of carbon monoxide can be prevented by making sure that fireplaces and kitchen stoves function properly.

High carbon monoxide levels in indoor air cause symptoms of carbon monoxide poisoning: headache, nausea, and shortness of breath. Breathing in excessive amounts of carbon monoxide can be fatal.

6.5 Radon

Radon is a radioactive gas that cannot be detected by the human senses. Radon does not cause any immediate symptoms. In households, the most common source of radon is the soil. In high radon areas, radon can enter the building through leaky structures such as floor cracks, structures connected to the floor, and the seams of floor penetrations. Radon can also be found in well water.

The radon content of indoor air can only be determined through radon testing. If the indoor radon level is higher than recommended, it can be reduced at a reasonable cost. Radon mitigation methods include sealing the building's envelope, boosting ventilation, installing a sub-slab suction system, and building a radon well outside the house.

When constructing a new building, the radon problem can be solved by installing radon pipes under a slab on grade during the foundation stage. The radon pipes are used to draw the radon out from under the slab.

Long-term exposure to high radon levels significantly increases the risk of developing lung cancer. In Finland, radon is estimated to cause approximately 300 cases of lung cancer every year.

For more information on radon, visit the website of the Radiation and Nuclear Safety Authority at www.stuk.fi.

6.6 Ozone

The primary source of ozone is outdoor air. The ozone level of indoor air may be increased by devices such as air purifiers, air source heat pumps, laser printers, and copiers. Devices that generate ozone should not be used in rooms where people live and spend time.

Since ozone is a strong oxidising agent and a reactive gas, it is harmful even in small concentrations.

Acute ozone-related symptoms include cough, breathing difficulties, a sore throat, and asthma flare-ups.

Ozonation

We do not recommend doing ozonation at home. If ozonation is used to remove odours and airborne pollutants, the harmful by-products and effects on health and materials should be taken into consideration. Ozonation removes odours by breaking down chemical impurities.

Ozone oxidation can generate new compounds and fine particles that are harmful to health. Ozone may also react with surface materials and damage them. Current knowledge suggests that ozone is not effective in eliminating mould spores and bacteria.

Even high ozone concentrations cannot eliminate microbial growth, so the only option is to repair the damaged structures.

There should be a two-day post-ozonation safety period before the facilities can be used again. Do not stay in the facilities during the ozonation process and the two days following it. Ventilation should be boosted after ozonation to eliminate any airborne pollutants. After the safety period has passed, wipe surfaces to remove any impurities.

7 Tobacco smoke

Smoking should be avoided indoors. Since second-hand smoke has the same harmful compounds as first-hand smoke, people who are in the same room are exposed to the same health hazards as the smoker. People can also be exposed to the harmful effects of tobacco smoke through so-called third-hand smoke: the residual tobacco smoke that clings to indoor surfaces before being released back into the air.

Tobacco smoke contains more than 4,000 compounds, of which 70 are carcinogenic. Tobacco smoke can cause shortness of breath in people suffering from conditions such as asthma. It can also increase respiratory and ear infections in children.

Smoking is prohibited in the common indoor areas of residential buildings. The building's regulations may also prohibit smoking in common outdoor areas.

If tobacco smoke spreads from one apartment to another through ventilation or structures, the housing company is responsible for fixing the problem. What this usually means in practice is ensuring sufficient introduction of make-up air in apartments, balancing the airflows of the ventilation system, and sealing any leaks and cracks in the structures.

When people smoke on their balconies, the smoke gets inside the building through windows and supply air vents. If smoke is spreading to your apartment from outside, from your neighbour's balcony, for example, the best way to deal with the problem is through negotiation. You should first try to address the issue with your neighbour in a positive tone. If that does not help, you can contact the building manager or the board of the housing company orally or by submitting a written notification. If this does not solve the issue, you can report the problem in writing to the local health inspector.

For more detailed guidance on tobacco smoke-related problems in residential buildings, visit www.valvira.fi.

For more information on the health effects of smoking and support for quitting smoking, visit our Stumppi.fi service (in Finnish).

8 Cleaning

Cleaning is a crucial factor for indoor air quality. There is no need for over-cleaning, however, even if someone in your family has allergies. A basic cleaning routine and regular surface cleaning are enough.

It is advisable to use easy-care, dust-free surface and interior decoration materials at home. The best way to remove dust is to use a damp microfibre cloth or a powerful vacuum cleaner fitted with a HEPA filter.

It is also a good idea to make sure that the place is easy to clean. When you keep your things in order and make sure that the furniture can be easily moved around, cleaning is an easy task.

Mild cleaning products are enough for keeping your home clean. Strong cleaning agents and disinfectants are not needed in normal cleaning. Check before use that the detergent is suitable for the surface in question. We recommend using fragrance-free cleaning products.

9 Hazardous materials

Hazardous materials are substances found in construction and renovation materials that have later been shown to be harmful to human health or the environment. Harmful substances that have absorbed into materials are also considered hazardous materials. Hazardous materials contained by structures and soil can lead to indoor air problems.

The most typical hazardous construction materials are asbestos, the PAHs (polycyclic aromatic hydrocarbons) found in creosote, PCBs (polychlorinated biphenyls), and harmful metal compounds, such as lead.

Typical hazardous substances found absorbed in construction materials are petroleum hydrocarbons and PAHs. For more information on asbestos, see our guide “Asbestos and Respiratory Health”.

Hazardous materials should always be taken into account in repair and demolition work and in the sorting of construction waste, if the building was constructed before 1994.

If there is reason to suspect that the building's structures contain hazardous materials, a hazardous materials survey should be conducted before the repair work starts. The presence of hazardous materials affects repair planning and demolition work.

The owner of the property is primarily responsible for arranging a hazardous materials survey in the building.

Hazardous materials surveys are carried out by trained asbestos and hazardous material experts (so-called AHA experts) and building health experts. For information about professionals certified by Eurofins Expert Services, go to www.sertifikaattihaku.fi.

10 Identifying indoor air problems at home

Indoor air problems are usually the result of many factors. At best, indoor air quality issues reduce comfort, but at worst, they can put your health at risk. In most cases, indoor air problems are caused by poor ventilation. They can also be linked to dust and chemicals released by construction and interior decoration materials, structural dampness and mould, inadequate cleaning, polluting activities, unpleasant temperature conditions, or noise issues.

It is not normal if your apartment has a strange smell, such as a mouldy, earthy, sewer, or chemical-like odour. The source of the smell should be identified and eliminated.

Often the cause of indoor air quality issues cannot be detected by our senses. Even widespread mould problems may not necessarily cause smells or visual signs. In this case, symptoms may lead you to suspect an indoor air problem. It raises serious suspicions if the symptoms are always triggered in a particular building.

10.1 Responsibility for home maintenance and indoor air quality issues

The owner of the property is responsible for maintenance and repairs and for investigating problems and damage.

House owners are responsible for taking care of the house and for the quality of indoor air. If there are problems, you should seek expert help from, for example, civil engineering firms that carry out indoor air quality and building condition surveys, to start the investigation process. You should ensure that the person or company that carries out the inspection has up-to-date training and qualifications.

If you are a **shareholder of a housing company**, you do not own the structures or systems in the apartment. They are the housing company's responsibility. The principles for the division of responsibilities in a housing company are defined in the Limited Liability Housing Companies Act. The basic rule is that the shareholder

is responsible for the interior of the apartment, such as interior surfaces and furniture, whereas the housing company is responsible for the structures and systems.

The Finnish Real Estate Federation maintains a table on the distribution of the housing company's maintenance responsibilities based on an interpretation of the Limited Liability Housing Companies Act (table available in Finnish). The table provides more detailed information on the division of maintenance responsibilities between the housing company and the shareholders. If any maintenance work under the responsibility of the housing company has been transferred to the shareholder, this should be stated in the Articles of Association. Shareholders should familiarise themselves with the Articles of Association and find out who is responsible for what maintenance tasks. As the responsibility for structures and systems and their maintenance primarily lies with the housing company, the shareholder must contact the building manager as soon as possible if they suspect indoor air or moisture problems. It is advisable to contact the building manager in writing and send a copy to the board of the housing company.

It is the housing company's responsibility to solve any problems related to the structures and systems of the building. If the housing company does not take the necessary measures to investigate the health hazard and, when necessary, to fix or limit it, the occupant can contact the **local health protection authority**. Health protection authorities can order the housing company to carry out the necessary measures.

No inspections requiring dismantling of structures or changes to the systems may be carried out without the permission of the housing company.

Tenants are responsible for keeping the apartments they rent in good condition. Tenants must report any identified deficiencies, damage, and suspected indoor air problems to their landlord as soon as possible. It is best to submit the notification in writing. If the landlord does not take the necessary measures to eliminate the health hazard, the tenant can contact the local health protection authority.

The tenant is responsible for paying for any damage caused to the apartment wilfully by the tenant or due to negligence. Negligence includes failure to report deficiencies or issues that the tenant has detected.

10.2 Stages of investigating indoor air problems

The investigation of indoor air problems is a step-by-step process that covers the entire building and its systems. Since there are usually many factors at play, indoor air quality surveys must be comprehensive.

Any indoor air quality issues should be investigated and fixed right away. Delays will only make the situation worse. Repair decisions should always be supported by reliable data about the building's condition. Surveys and measurements should be carried out by trained and experienced professionals.

Information on certified building health experts and indoor air specialists can be found on the website of Eurofins Expert Services at www.sertifikaattihaku.fi. Information on moisture damage investigators is available on the website of Fise Oy at www.fise.fi.

10.2.1 Background work

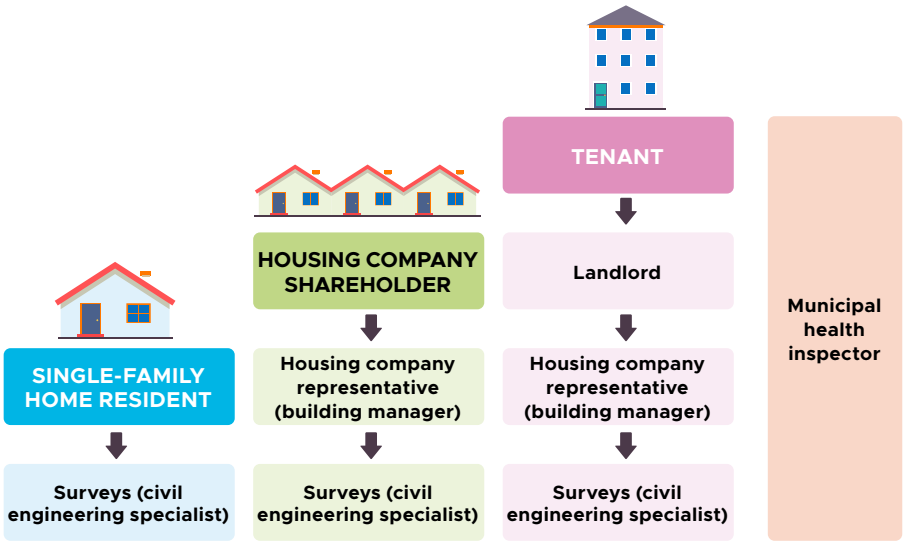
The specialist starts the indoor air survey by learning about the building and interviewing the occupants to collect information about their observations and prior repairs and maintenance work.

The occupants are also asked if they have had any health issues. If the occupant's symptoms go away when leaving the building and come back after returning to the building, there is reason to suspect an indoor air problem. The specialist studies the building's structural and mechanical systems drawings to identify any risk locations. Risk locations are structures that may contain moisture problems.

10.2.2 Sensory evaluation

A professional sensory evaluation provides direction for locating the source of the problem. During the sensory evaluation, the specialist tours the interior of the building and inspects the building from the outside. Sensory evaluations are supported by temperature, airflow, and surface moisture measurements.

The specialist may also have a surface moisture meter to measure the variation of moisture content in structures. Attention should also be paid to the functioning of the ventilation system and the system's potential impact on spreading pollutants in indoor air.



10.2.3 Preliminary risk assessment and survey plan

The background information and sensory evaluation give the specialist an insight into the functioning and condition of the building's structures and systems.

Based on this information, the specialist can prepare a preliminary risk assessment of potential indoor air quality problems and damage. If the inspector suspects that a structure is affected by moisture or a condition-related issue, the structure must be examined in more detail.

The preliminary risk assessment reveals whether any indoor air pollutant tests, such as indoor air measurements or surface tests, need to be carried out. The risk assessment also reveals if there is a need to carry out a hazardous materials survey, such as an asbestos survey.

If the building has extensive indoor air quality problems and several structures need to be inspected, it is a good idea to prepare a survey plan.

10.2.4 Indoor air quality tests and measurements

The survey methods are selected according to the building and its problems. The tests and measurements must be carried out using established, benchmarked methods.

The measuring instruments must be maintained and calibrated regularly. The studies must comply with the Decree on health-related conditions of housing and the guidelines for its application.

The investigated factors include:

- the condition and functioning of ventilation units, and the efficiency and balance of supply and exhaust airflows
- the condition and functioning of heating equipment; thermal conditions
- potential sources of dust, odours, and other pollutants
- sources of noise
- the condition and functioning of structures inside and outside; structures potentially damaged by moisture.

10.2.5 Reporting

The specialist writes a comprehensive report with a detailed description of the indoor air quality problem and the specialist's conclusions and suggestions for corrective measures and repairs.

The comprehensive survey is a good basis for planning the repairs. You should go through the report with the person who conducted the survey.

Go to the next page to learn about common indoor air problems

Common indoor air problems

STUFFY AIR
- **ineffective ventilation**
- **high indoor temperature**
- **high indoor humidity**
- **dust, impurities**

MOULDY SMELL
- structural dampness
- **mouldy materials indoors**
- odours and impurities from soil entering through leaky structures

SEWER SMELL
- **dirty, defective, or dry floor drain water trap**
- poorly sealed drainpipe connection

OTHER STRONG ODOURS
- **high-emission construction or interior decoration materials**
- supply air vent located near a source of pollution
- dirty ventilation system
- **poor cleaning**
- **bio waste**

SPREADING ODOURS
- not enough make-up air coming in from outside (strong negative pressure)
- wrong pressure conditions or airflows
- leaking ducts
- air leaking through structures
- **odours from outside (balcony smoking, wood burning, etc.)**

You can monitor the things marked in blue yourself

DRAUGHTS
- **low room temperature**
- **cold surfaces**
- **radiator covered with furniture**
- air leaking through structures
- high supply air velocity
- low supply air temperature
- incorrectly positioned supply air vent

LOW ROOM TEMPERATURE
- unadjusted or defective heating system
- **radiator or thermostat covered with furniture or curtains**
- air leaking through structures or poor thermal insulation
- high ventilation rate

HIGH ROOM TEMPERATURE
- unadjusted or defective heating system
- **sunlight entering the home**
- **heat emitted by machines or people**
- **ineffective ventilation**

DRY AIR
- **low outdoor air temperature**
- **high indoor temperature**
- **dust or impurities**
- high ventilation rate

NOISE
- **poor soundproofing**
- incorrect or ventilation setting or poorly soundproofed ventilation
- noise from radiators or plumbing fixtures

CONDENSATION
- poor insulation
- **furniture against the external wall**
- **high moisture generation rate**
- ineffective ventilation
- positive pressure

The Organisation for Respiratory Health in Finland

11 Fuel-fired appliances

The most common fuel-fired appliances used at home are fireplaces, ovens, kitchen stoves, and sauna heaters. The owner or occupant is responsible for ensuring that the fireplaces and chimneys are in good condition to enable safe use and that the chimneys have been swept in accordance with the law. Chimney sweeping must be carried out by a professional. Fireplaces and chimneys must be swept once a year in permanently occupied dwellings and once every three years in recreational dwellings.

In dense envelope houses, combustion air is brought in from outside for each fireplace through separate ducts. The location of the combustion air duct is determined by the fireplace manufacturer's recommendation. The supply of combustion air to fireplaces must be indicated in the ventilation plan.

The need for combustion air is a factor that should be taken into account when planning renovations in old houses and apartments.

The supply of additional outdoor airflow required by the use of any fuel-fired appliance and separate extraction systems, such as cooker hoods, must be designed so that the building's ventilation system functions in a controlled manner and there are no detrimental changes in pressures in the building or rooms.

Ventilation units may have a fireplace setting that helps during the ignition phase, but it does not replace a combustion air duct.

12 Saunas

Finnish homes have saunas that come in different sizes and with different types of materials and sauna heaters. The way the sauna is positioned inside the home varies. The ventilation systems used in houses and apartments also vary. For these reasons, sauna ventilation should always be designed with the individual characteristics of the house or apartment in mind.

Ventilation has a big effect on the overall sauna experience. Ventilation brings in oxygen for the combustion of

wood and the circulation of air in the electric heater. It also brings in fresh air to breathe and removes stale air. When there is enough fresh air in the sauna, it is easy to breathe. Poor ventilation leads to high CO_2 levels, which can quickly make you feel tired.

Properly functioning sauna ventilation helps keep your sauna fresh and dry between bathing. To make sure that the structures dry and the excess moisture evaporates, air out the space after bathing by boosting the ventilation or opening the windows while ensuring sufficient after-heat.

12.1 Sauna temperature and humidity

The key elements of an enjoyable sauna experience are good indoor air conditions: temperature, humidity, and fresh air.

The recommended temperature is between 75°C and 105°C at head level. The recommended relative humidity is between 27% and 7%.

The higher the temperature of the sauna, the drier the air. Temperatures above 105°C are not recommended, as you will be exposed to an extremely high heat load when you throw water on the stones. Besides, the fire safety regulations of electric sauna heaters prohibit temperatures above that.

If the temperature is below 75°C, people tend to throw more and more water on the stones. This means that the relative humidity of the sauna increases, making you sweat more. The more you sweat, the more often the benches and surfaces need to be cleaned.

12.2 Different types of sauna heaters

The most common sauna heaters are electric sauna heaters and continuously heated, wood-burning sauna stoves. The indoor air conditions of the sauna are affected by the type of sauna heater you have. It is important to follow the heater manufacturer's recommendations to ensure fire safety compliance and to choose a heater with the right capacity.

Aspects that should be taken into account when choosing the right heater capacity include the volume of the sauna room, the structures, and the heat radiation from interior surfaces. You will need a more powerful heater if your sauna has a lot of windows or other non-insulated surfaces, such as glass, brick, concrete, solid timber, or ceramic tiles.

Generally you will need about 1kW of power for every cubic metre. As a rule, every 1 m^2 of uninsulated surface adds 1.2–1.5 m^3 to the volume of the sauna room. If the sauna has a glass wall/door or a tiled surface on an insulated base, a multiplier of 1.2 is used. To calculate how the flue and brickwork affect the volume, a multiplier of 1.5 is used. Ceramic floor tiles have no effect when calculating the sauna volume.

You should do the calculations carefully.

Electric heaters:	Advantages of electric heaters:
» regular heaters with timers » continuously heated heaters » infrared heaters Please note: These often require mechanical ventilation. Electric heaters have their own particular odour and noise.	» easy placement: placement not dictated by the location of the flue; fire safety distances are usually shorter » easy to heat with a timer or remotely; consistent heat » economical » unlimited heat » a wide range of models and technologies
Wood-burning heaters:	**Advantages of wood-burning heaters:**
» continuously heated heaters » heat-storing heaters » smoke sauna heaters Please note: Getting the wood and using it to heat the sauna can be a lot of work. Wood burning generates fine particle emissions and flue gases. Strict placement, space, and fire safety distance requirements. *	» ventilation usually works well » presence of real fire » natural sounds and the smell of burning wood » does not rely on electricity » possibility to heat water

* Modern Finnish wood-burning stoves are designed to burn wood efficiently to reduce emissions and promote energy efficiency.

If the heater is not powerful enough, it has to be heated longer and with more power, which will shorten the life of the heater.

12.3 Sauna ventilation

The air should change once every 3–8 hours in the sauna. The more people the sauna can accommodate, the more the air needs to circulate. If the sauna is located inside an apartment, the airflow rate should be at least 6 litres per second. In an apartment block's common sauna facility, the airflow rate should be at least 2 litres per second per square metre.

Factors that affect the ventilation rate of a sauna with a natural ventilation system are:

» the size and location of ventilation openings
» the airtightness of structures
» temperature
» opening the sauna door.

To achieve an even vertical distribution of heat in the sauna, the indoor air has to mix well. The cold supply air tends to sink down towards the floor unless it is forced to mix with the warm air circulating in the sauna. This phenomenon is more prominent in winter if the fresh air is not heated.

To avoid a cold air mass gathering at the bottom of the sauna, the make-up air should be brought in above the heater. This way, the fresh make-up air is mixed with the hot air circulating in the sauna, allowing warm air to reach the lower part of the sauna, as well. When designing bench placement, keep in mind that the top of the lower bench should be placed higher than the top of the heater. Otherwise your feet, which are extremely sensitive to temperature, will be caught in the cool air mass at the bottom.

Placing the exhaust vent in the bottom part of the sauna helps the hot air mix with the cool air at the bottom. Good floor insulation also helps keep the air at the bottom warmer.

12.3.1 Natural ventilation in an electric sauna

It can be challenging to achieve good ventilation with a combination of an electric heater and a natural ventilation system. This is due to the impact of weather conditions.

» Outdoor and indoor air temperature differences affect the pressure difference between the sauna and outdoors.
» Wind direction and wind force have a significant effect on ventilation.

Fresh air should be drawn in through a make-up air vent placed above the heater. The exhaust vent should be placed as far from it as possible, either near or on the ceiling. Cold outside air should not be directly brought into the bottom part of the electric heater. This could cause the heater to overheat, especially if the heater has a thermostat mounted on it.

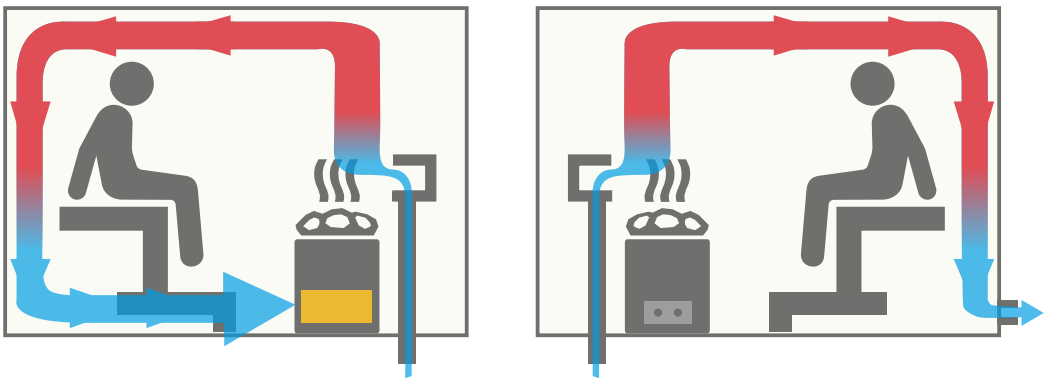
12.3.2 Natural ventilation in a wood-heated sauna

Ventilation usually works well in a sauna with a wood-burning heater and a natural ventilation system. Fresh air is drawn in either from outside through a vent above the heater or from the adjacent washroom through a gap under the door.

Given that a wood-burning sauna stove consumes a lot of air, there is no need for a separate exhaust air duct. The exhaust air is removed from the sauna through the flue. A wood-burning heater consumes 3–5 times the cubic volume of air in the room for combustion. However, it is still a good idea to install an adjustable exhaust vent near or on the ceiling to air out and dry the sauna after bathing.

12.3.3 Mechanical sauna ventilation

If your home has a balanced mechanical ventilation system, the ventilation unit will bring fresh make-up air into the sauna and remove stale air. This makes it easy to manage the ventilation of your sauna, regardless of whether you have a wood-fired heater or an electric heater. Mechanical sauna ventilation should always be planned by a professional ventilation designer.



How fresh supply air is mixed with heated air in a wood-heated and electrically heated sauna.

13 National advocacy work

The Organisation for Respiratory Health in Finland continuously influences political decision-making by keeping in touch with policymakers and officials and by raising issues in various working groups and in the public discussion.

In addition, the Organisation for Respiratory Health in Finland designs tools and models in collaborative projects to bring solutions to the promotion of respiratory health.

National programmes

The Organisation for Respiratory Health in Finland engages in long-term advocacy work through national programmes. The Organisation for Respiratory Health in Finland brings the perspectives of people suffering from symptoms caused by bad indoor air and of people affected by water damage and mould exposure to the *Terveet tilat 2028 programme and the Finnish Indoor Air and Health Programme 2018–2028 programme*. We pass on information about best practices and tried and tested solutions to these programmes.

- » We highlight the importance of peer support.
- » Being affected by water damage and mould exposure in your own home can also lead to financial difficulties.
- » The situation can also be a burden to your social life, since you have to find temporary accommodation and long-term storage space, and you also need to replace your fixtures and furniture.

The Organisation for Respiratory Health in Finland makes the voices of people suffering from indoor air-related symptoms heard in working groups that make solutions that will affect people's everyday lives. Dialogue must take place throughout the programme period to achieve a better understanding and to ensure that different views are heard by the people who make the decisions.

Peer support is the way forward

In peer support activities, people who share the same life situation, experience, or problem meet and share their thoughts, feelings, experiences, and knowledge with each other. Peer activities are based on a sense of belonging, a sense of community, and mutual respect. Peer activities highlight expertise through experience and, as a result, increase the participants' hopefulness and faith in themselves.

Peer support and feeling understood by those close to you are an invaluable help to those suffering from symptoms. All too often, people who experience indoor air-related symptoms are dismissed or not believed. It can be difficult for those close to someone with such symptoms to understand an issue that involves so much fragmented information. Understanding the issue is also made more complicated due to the fact that the symptoms and their causes vary greatly from person to person. The places that symptomatic persons can tolerate also vary. Some people who experience indoor air-related symptoms also have a respiratory disease, such as asthma.

The information gained from peer activities encourages people to strive for balance and calmness in their lives. Stress management, healthy nutrition, and regular exercise support well-being and complement the physician's instructions for managing the symptoms.

Peer support is available by phone, online, and in different locations around Finland. The Organisation for Respiratory Health in Finland has an indoor air-related helpline, which is run by volunteers and is part of the PuhEet advisory board (advisory board for the ethical principles of phone and online help services in Finland). The advisory board ensures that the helplines and online help services authorised by it provide high-quality services in an ethically justified and sustainable manner.

Helpline for people suffering from indoor air problems

(in finnish)

The helpline for people suffering from indoor air problems is open on Tuesdays 9–12 and on Thursdays 16–19, at **+358 44 407 7010.** Volunteers trained by the Organisation for Respiratory Health in Finland provide peer support to people affected by indoor air-related problems and symptoms, and their friends and family.

Organisation for Respiratory Health in Finland indoor air peer group on Facebook (in finnish)

The purpose of the indoor air peer group is to provide peer support in a confidential and resource-focused environment to those with symptoms caused by bad indoor air. Expert lectures and/or live chats are held once a week.

The Organisation for Respiratory Health in Finland's online exercise group Lempeä Liike (in finnish)

Weekly workout sessions streamed to your home.

Peer groups of respiratory associations (in finnish)

Many of our local respiratory associations have set up peer groups for people with indoor air-related symptoms to share their experiences and concrete tips for coping with everyday life. See up-to-date list at www.hengitysyhdistys.fi.

REMEMBER!

Water Damage at Home and Your Health
Asbesti ja hengitysterveys
Polta puuta puhtaasti
Pienhiukkaset

The Organisation for Respiratory Health in Finland

VALLOX
HOME of FRESH AIR

Relaxing Moments HARVIA Natural Wellbeing

The contents of this handbook were planned by Kirsi Säkkinen and Hanna Salminen. The draft of this guide was commented on by Training Manager Ali Aaltonen from Vallox Oy and Technical Director Teemu Harvia from Harvia Group. The contents have been checked by Timo Kujala.

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Layout: Vitale Ay

JOIN YOUR LOCAL ASSOCIATION

The Organisation for Respiratory Health in Finland and its local associations promote respiratory health and good life for people suffering from respiratory diseases.

You can also fill out a form online at www.hengitysliitto.fi/liity jaseneksi.

☐ **I want to become a member**

☐ **I want to become a secondary member of the local association of** _____ , I am a member of the ___ local association.
(paying the membership fee of both associations)

SURNAME AND GIVEN NAMES (underline your preferred name) ›	ADDRESS ›
DATE OF BIRTH ›	
PROFESSION ›	POSTCODE AND CITY/TOWN ›
TELEPHONE ›	PLACE OF DOMICILE ›
FIRST LANGUAGE ›	EMAIL ›

☐ You can send me information about events and activities by text message and e-mail

☐ I am a guardian of a child who is under 15 ☐ I am under 15 years old

I am interested in respiratory diseases (please specify which):

A member of my family is already a member of a local respiratory association:
☐ No ☐ Yes NAME ›

Your membership fee depends on your local respiratory association. We will send your membership application to the respiratory association of your home municipality. The privacy statement of the membership register is available at: www.hengitysliitto.fi/liity-jaseneksi.

☐ **I hereby accept that the information above will be saved in the register of members controlled by the local association and processed by Hengitysliitto ry (The Organisation for Respiratory Health in Finland).**

DATE ›	SIGNATURE›	GUARDIAN'S SIGNATURE IF YOU ARE UNDER 15 ›

The website and YouTube channel of the Organisation for Respiratory Health in Finland feature a lot of up-to-date information on respiratory health, respiratory diseases, and indoor air quality. Follow us for updates on our activities and the latest news:

www.hengitysliitto.fi
@Hengitysliitto

The Organisation for Respiratory Health in Finland

The Organisation for Respiratory Health in Finland

LOCAL ASSOCIATIONS FOR RESPIRATORY HEALTH OFFER MANY BENEFITS FOR THEIR MEMBERS:

» Local respiratory associations regularly organise peer groups and sports activities, events, lectures and other types of recreational activities.
» Come and join the activities as a volunteer peer instructor, sports instructor, expert by experience, or elected representative in the organisation. The Organisation for Respiratory Health in Finland offers training for its volunteers.
» The member magazine, *Hengitys*, comes out four times a year.
» Your can check the member benefits of your local respiratory organisation and the national organisation on their respective websites.

Fill in the form, cut it out, and fold it along the line on the reverse to form a letter. Fasten the edges with tape. The postage is paid by The Organisation for Respiratory Health in Finland, so you can drop the letter in a mailbox without a stamp.

Postage paid by The Organisation for Respiratory Health.

Hengitysliitto ry
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