VENTILATION SYSTEM

MIKrovent®

Up to 87% of heat recovery at 100% air exchange

Controlled and high quality room ventilation

with minimal heat loss for a pleasant and healthy living environment

Save up to 21.604 €
in 25 years

mikrovent.si/en

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MIK CELJE

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WHY DO WE NEED TO VENTILATE?

Fresh air is one of the key factors of healthy living.
With the MIKrovent® you are guaranteed a controlled and economical way of ventilating the apartment while keeping your windows closed.

One of the most important components that significantly affect our quality of life, well-being and living conditions in a house or an apartment is reliable temperature control and high quality fresh air in a room with closed windows.

The MIKrovent® ventilation system ensures high quality ventilation with minimal heat loss and also helps prevent the occurrence of **black mould**.

In the past buildings always had plenty of fresh air. The method of construction and quality of materials enabled buildings to breathe. Heating costs did not yet present a problem. **But modern buildings have become more and more airtight because of the pressing demand for energy efficiency.** In addition to heat loss reduction, improved air-tightness of the buildings causes some negative effects such as retention of low quality air and humidity inside a room (leading to condensation on the glazing and mould).

A Building's Energy Consumption

In a properly glazed and insulated building, 50% of the energy is used for heating and cooling the building to a temperature suitable for a high quality and comfortable living environment and the **other 50% of the energy is used for ventilation of a living area**. Therefore, proper ventilation is of equal importance as glazing and insulating the building since it considerably increases the energy and cost efficiency.

Inadequately ventilated rooms have stale and stuffy air.

High quality modern windows are much **more airtight** and have **better thermal insulation**. These modifications **prevent the uncontrolled exchange of air** and **humidity with the outside** environment **through small cracks**. Consequently, the microclimate of the apartment or house has been completely altered. **High concentrations of harmful gases, humidity and exhaled CO_2 can no longer be balanced out by the lower concentrations found in fresh air.**

The best living conditions in a room are achieved when **the temperature is between 18°C and 22°C and the relative humidity is between 35% and 70%. Excessive relative humidity is unpleasant** and can cause water condensation on cool surfaces like walls and glass. **Low relative humidity**, on the other hand, causes dust to be easily stirred, which dries the mucous membrane and generates **a feeling of dry air**.

HOW TO VENTILATE with MIKrovent?

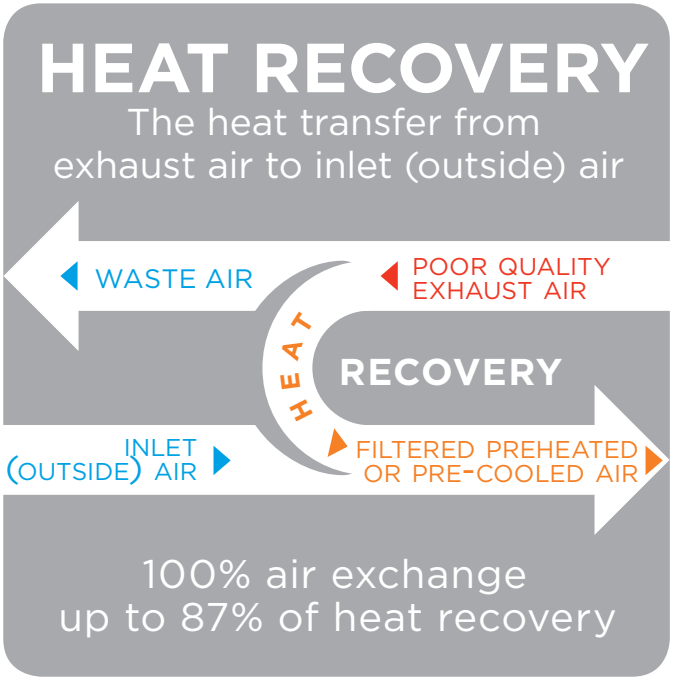
MIKrovent® is a unique local ventilation system that **replaces the need to ventilate a room by opening windows** while **conserving 87% of the heat from exhaust air** with 100% air exchange within the room.

Living areas can be ventilated in several ways:

- natural ventilation; by occasionally opening windows for a short period of time, allowing cold and unfiltered air into the room, causing a draft and 100% heat loss in the winter and vice versa in the summer
- mechanical or forced ventilation (local or central); through which the air is filtered, preheated or pre-cooled and supplied to a room without a draft or significant heat loss

Even though natural ventilation has proven to be effective, it is **very energy inefficient**, causes a draft and facilitates infiltration of noise, dust particles and bugs from the outside.

Occasional uncontrolled natural ventilation of living areas causes a significant loss of heat because the fresh, outside air has to be reheated in the winter and re-cooled in the summer to a room temperature.



High quality mechanical ventilation devices (local or central) must have an integrated heat recovery system for exhaust air because only then can the ventilation of living areas be ensured in an energy efficient way.

Flexible and economical local ventilation

Central ventilation systems usually run constantly in every room with the same efficiency. **With a local ventilation system you are guaranteed a better flexibility. The humidity and freshness of the air can be regulated for each room individually according to your own needs.** The demand for fresh air in different rooms varies throughout the day. For example, more fresh air is needed in areas such as bathrooms in the morning, kitchens in the afternoon and living rooms and bedrooms in the evening. **Therefore local ventilation is much more manageable and cost efficient.**

The local ventilation system runs only when and where it is needed and can be individually adjusted to each and every room.

HOW DOES MIKrovent WORK?

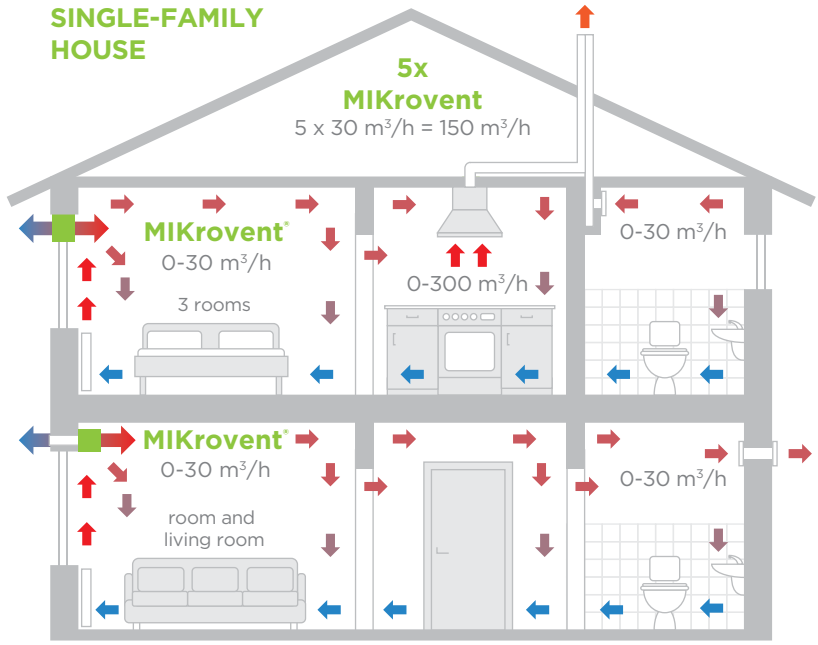
MIKrovent® is a system for decentralised ventilation of new and existing buildings with **heat recovery up to 87%** at **a 100% air exchange** within the room and the optional humidity and/or CO2 control in ventilated rooms.

MIKrovent's function is similar to that of an open window. It supplies the room with fresh air and exhausts stale air to the outside. Unlike the open window, it distributes fresh air equally around the whole room and ensures pleasant living conditions without **a draft or any extra noise**. **The supply and exhaust air openings are equipped with washable filters that prevent bugs and dust from entering the room.**

Fresh, high quality air in your home even when you are not at home

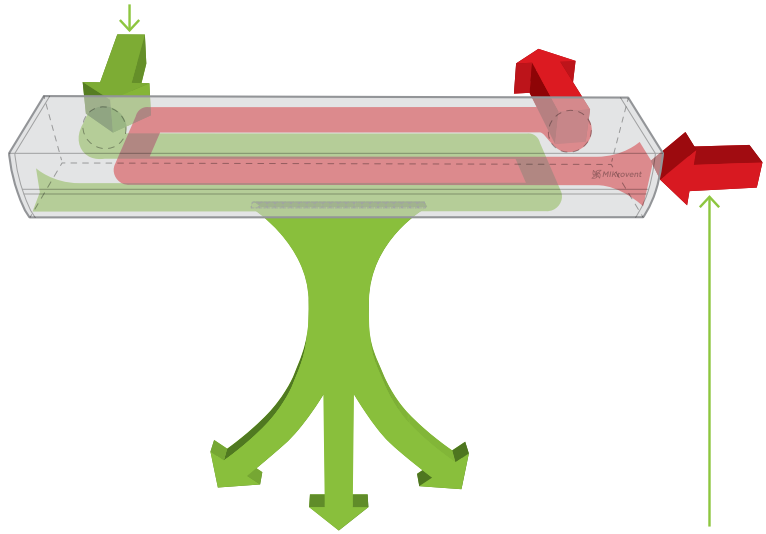
MIKrovent® is a **remote controlled** ventilation system with **4 preset** levels of intensity: **normal ventilation**, **intense ventilation**, **strong gust ventilation** and **exhaust of the indoor air**. The air supply opening in MIKrovent® can be manually closed, thus sealing the building completely and preventing the negative effects of strong wind on tall buildings. MIKrovent® can come equipped with a CO_2/VOC (volatile organic compounds) or humidity sensor, which automatically turns on or increases the intensity of ventilation of MIKrovent® every time that the concentration of humidity, CO_2 or VOC rises above or drops under a preset level. Thus MIKrovent® provides the **option of automatic regulation** of air quality within a room, as well as the **option of manual activation** or **deactivation of the device**.

A state-of-the-art remote controller for MIKrovent.



100% fresh air with up to 87% heat recovery

The supply fan sucks the outdoor air through an entrance grille and an outdoor air filter, pushing it through the patented heat exchanger made out of polypropylene into a room. Our capillary-like heat exchanger (heat recuperation system) is available in two standard sizes (595mm and 850mm) thus allowing the installation of MIKrovent® onto windows of different sizes.



The exhaust fan sucks the warm air from under the ceiling through an indoor air filter and pushes it through the heat exchanger to the outdoors. Since the air under the ceiling is usually the warmest and the most polluted, two problems are solved at once; **the heat from the poor quality indoor air**, is being exploited to heat the fresh incoming air and at the same time **the polluted air is being expelled**.

MIKrovent® is a window ventilation system **integrated with a window frame** or **attached onto roller shutters**. It can be easily installed in any room with a window, no matter whether the building is old or new.

Because of its compact design and outstanding heat recovery, MIKrovent® is **suitable for apartments, houses, kindergartens, schools, as well as hospitals, retirement homes, hotel rooms and, of course, offices.**

Ventilation system MIKrovent® 300

is a specialized design of MIKrovent® ventilation system developed especially for the ventilation of larger areas (schools, kindergartens, halls...) where large groups of people work or spend time. 1 MIKrovent unit **enables up to 120m³/h of air exchange and up to 90% heat recovery**.

In office buildings ventilation must be in accordance with the Working Conditions Act which requires the supply of fresh air to be between 20–30m³/h per employee during working hours. Similarly, offices also have larger common areas (such as boardrooms and conference halls) that are occupied only a small portion of the time and need intense ventilation only during occupancy. When these areas are not occupied it is sensible to ventilate them with only minimal intensity to get rid of the harmful admixtures in the air from furniture and building material emissions. Thus **MIKrovent® ventilation system presents an excellent choice for office buildings. It reduces the need for constant operation by the central ventilation system and therefore lowers the overall cost for building ventilation.**

MIKrovent® specifications:

Ventilation system	MIKrovent® 100	MIKrovent® 300
Air flow in m³/h	**10–30**	**40–120**
AC/DC voltage in V	230/12 & 110/12	230/12 & 110/12
Required power in W	4-21	25-45
Heat recovery (η1) up to in %	71-87	70-89
Room sound level with 8dB noise reduction*	25-35	26-35

* Depends on result of preliminary measurement. Data is based on measurements in higher temperature conditions (t1=40°C, flow=24°C). The data is gathered at an input source and includes transformer and control. We reserve the right to alter technical specifications at any time.

MIKrovent® 300

HOW DOES MIKrovent WORK?

With indoor and outdoor air filters and up to 87% heat exchange from warm indoor air to fresh outdoor air, MIKrovent® excels among the world's most modern solutions for local ventilation systems.

MIKrovent® is environmentally friendly product made out of recyclable and durable materials.

MIKrovent® is easy to install and is therefore suitable for all buildings, new and old. It can be installed onto a window frame on whichever side of the window or it can be attached onto roller shutters.

Easy to install and operate

MIKrovent® is ventilation system can be installed in most MIK window systems. Because of its compact design it is **easy to install** and does not need any ventilation shafts or grilles to supply the fresh air; the only demand is a window opening. It is **easy to maintain and operate** and it provides fresh air and lowers the CO_2 concentration automatically with its automatic sensor system.

Economical and efficient

MIKrovent® is intended to work on a standard 230V electrical grid and it **ensures low electricity consumption thanks to the high efficiency fans** (check the specification chart).

MIKrovent® 100

25 m²

One MIKrovent® 100 unit is suitable for ventilation of rooms up to 25m²

MIKrovent® 300

60 m²

One MIKrovent® 300 unit is suitable for ventilation of rooms up to 60m²

ADVANTAGES of the MIKrovent ventilation system

The MIKrovent® ventilation system ensures **high quality air** with **minimum energy consumption, low maintenance** and **operating costs** and a long lifespan.

Advantages:

- enables healthy, high quality and economical **ventilation of rooms while windows are closed**
- provides **up to 68% savings** with purchase, installation, operating and maintenance costs in comparison to similar ventilation systems
- **4x lower initial investment costs** in comparison to a central ventilation system – the **price for MIKrovent® starts from 690€/item + VAT**
- does not require any additional shafts for air distribution so **there is no cleaning** or **extra electricity costs** for distributing air through shafts
- **all the characteristics of a closed window** (such as protection from burglary, sound and thermal insulation) **are retained**
- **prevents a draft**, the infiltration of dust and outdoor noise, the potential for mould and the facilitation of favourable living conditions for mites...
- it is **easy to use** and is easily adjusted to your needs (automatic or manual control)
- it is **possible to connect** MIKrovent® to a **central control system** or upgrade it with CO_2/VOC and humidity sensors
- with the usage of high quality washable filters (F7, F8) for fresh air, it **makes life easier for allergy prone people** by preventing the entry of different insects and by cleaning the air
- it is a **part of frame extension profile**, which makes it very inconspicuous
- **ideal for thermal renovation** of old buildings and more than suitable for new buildings as well
- can **fit to any window size**
- ensures that ventilation is **in accordance with the EU energy efficiency directive** from 1.3.2009
- **patented in 52 countries** around the world and awarded the Silver Guild from Chamber of Crafts of Slovenia and the Gold Star from International Trade Fair in Celje, Slovenia

Edo Bahč,
Energy Consultant

MIK's MIKrovent® ventilation system conserves a lot of heat and saves a lot of money!

The ventilation of buildings has become a big problem that investors and owners are not fully aware of. With construction of residential and office buildings, most of the investors are still choosing central ventilation systems, a very expensive solution especially for smaller buildings, and an impossible choice for renovations. In addition, the central ventilation system includes all the rooms in a house; the level of intensity you choose is applied to the whole ventilated area and you cannot adjust the ventilation according to the room's needs. Often people will turn off the central ventilation to minimise their costs and start opening their windows, causing a lot of heat loss. MIKrovent®, on the other hand, is a local ventilation system which can be adjusted to each and every room individually. In addition, it ensures up to 87% heat recovery, meaning that fresh air supplied into the room is already heated, so there is no heat loss. **MIKrovent® is therefore an excellent solution for high quality local ventilation that does not require an expensive investment or other construction work on the building.**

Uroš Lukič,
MIC Velenje

MIKrovent® provides ventilation completely suited to your own needs and desires.

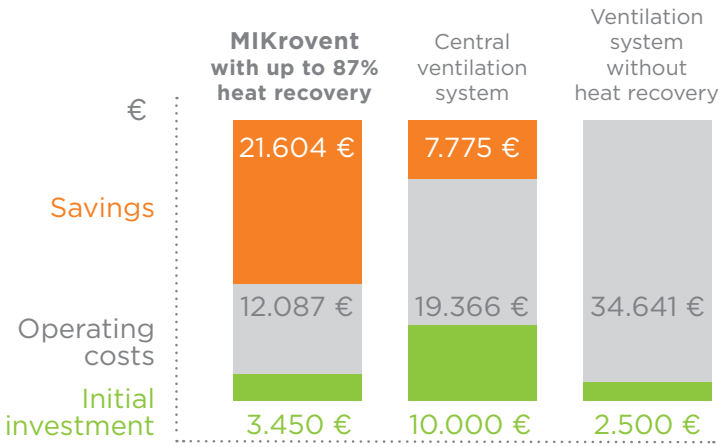
Here at MIC's (Inter-Enterprise Educational Centre) energy efficient complex we have two completely separated ventilation systems: **the central ventilation system** and **the MIKrovent® ventilation system**. The central ventilation system operates evenly throughout the building and with the same intensity, which can be very wasteful. Since all the rooms are not equally occupied we can really take advantage of **MIKrovent®**, which is **a local ventilation system**, that you can adjust to the specific needs of the room. For example, if one room is unoccupied then even minimum intensity ventilation will suffice. On the other hand, when a room is full, the quantity of exchanged air must also be increased. This right here is the key advantage of MIKrovent®. You can adjust the amount of incoming air for each room individually or you can turn it off in one room while the other rooms are still being ventilated. This is the way to optimal ventilation, and at the same time you save money on energy consumption. In addition, the costs of initial investments and maintenance of MIKrovent® are much lower than those of the central ventilation system. **For less money and with fewer expenses you get ventilation that is completely flexible but still high quality.**

Let's conserve energy. LET'S SAVE.

Save 21.604 € in ventilation costs
over 25 years for a 150m² house.

Minimal investment for huge savings

The costs of ventilating a building with a central ventilation system are, because of ventilation shafts and grilles, room for central unit, distribution of air etc., much higher than with MIKrovent. The **costs of purchase, installation, operating and maintenance of MIKrovent are up to 58% lower** than those of a central ventilation system.



		Single family house 150m² ❶			100 Hotel rooms or Offices 20–25m²	
	Type of ventilation device	Ventilation system without heat recovery	Central ventilation system	MIKrovent®	Central ventilation system	MIKrovent®
TECHNICAL SPECIFICATIONS	The amount of inlet and outlet air	150m³/h	150m³/h	**150m³/h**	3.000m³/h	**3.000m³/h**
	Heat recovery	0%	75-94% ~ 85%	**70-87% ~ 80% with 100 percent air exchange**	75-94% ~ 85% with 20-30% air exchange without external heat source	**70-87% ~ 80% with 100% air exchange without external heat source**
	Heating unit	/	/	**/**	min 15kW ❸	**/**
	Fresh air filter	F5	F5	**F5**	F5	**F5**
	Waste air filter	G4	G4	**G4**	G4	**G4**
	Power	35W	200W	**5 x 25W**	4kW	**2,5kW**
INITIAL INVESTMENT	The cost of device and installation	cca 2.500€	8.000 - 12.000€	**5 x 690€**	cca 80.000€	**69.000€**
ELECTRIC ENERGY (0,26€/kWh) ❹	Consumption per year	307kWh	1.971kWh	**537kWh**	28.032kWh	**17.520kWh**
	Costs of electric energy over 25 years with 4% inflation	3.328€	11.886€	**5.824€**	304.287€	**190.180€**
CLEANING	Costs of cleaning over 25 years with 3% inflation	0€	2.336€	**0€**	198.288€	**0€**
HEATING, COOLING AND VENTILATION	50% of energy for heating and cooling	750€	750€	**750€**	8.750€	**8.750€**
	1. 50% of energy for ventilation	750€	112€	**150€**	1.313€	**1.750€**
ELECTRIC ENERGY AND DUCT CLEANING	2. The costs of electric energy/year	80€	285€	**140€**	7.288€	**4.555€**
	3. Costs of cleaning per year (cleaning once every 3 years)	0€	cca 200€	**0€**	cca 17.000€ ❷	**0€**
COSTS ALTOGETHER	1+2+3 per year	830€	464€	**290€**	14.267€	**6.305€**
	1+2+3 over 25 years with 4% inflation and initial investment	37.141€	29.366€	**15.537€**	675.668€	**332.242€**
	In percentage	100%	79%	**42%**	100%	**49%**

❶ The costs for heating, cooling and ventilation of a 150m² house are approximately 1500€/year. For optimum ventilation of 150m² single family house (1x bedroom, 2x children's bedroom and 2x living room) 5 MIKrovent® units are required.

❷ The cleaning costs for a central ventilation system add up from 15.000 to 20.000€. A check-up is required every year by the Official Journal 56/99 of the Republic of Slovenia. We took into account that complete cleaning is required every 3 years.

❸ We did not take into account that 15kW central ventilation systems heat the air with an external source (such as heaters). Taking that into consideration only increases the reasons to purchase MIKrovent®.

❹ Source: Europe's Energy Portal - http://www.energy.eu/, Retail (end-user) energy prices for households for Germany. Reference month: November, 2011.

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