Eamac® space

Guidelines

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English

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Ventilation and Air Quality in Office

Read our guidelines and improve your workplace.

A few insights

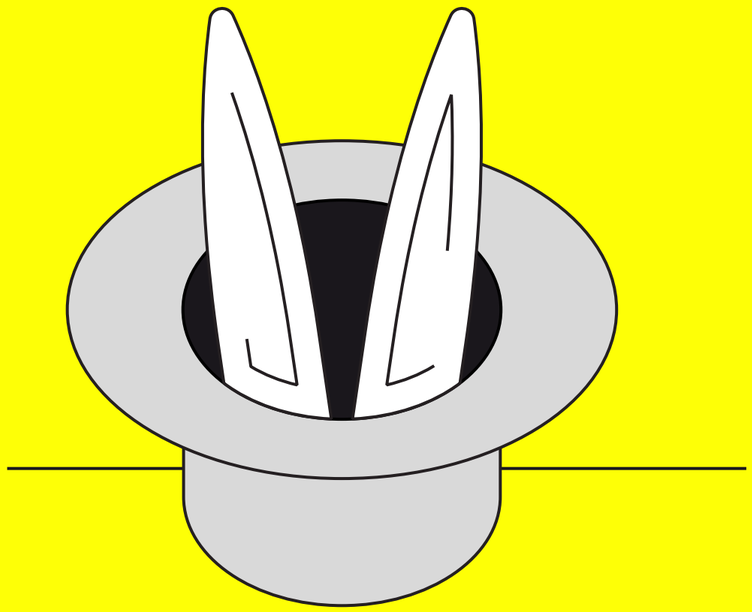
→ Good ventilation can be a great investment, offering high performance and efficiency.

→ There are multiple benefits of good air quality in the office, including reduced absenteeism, increased productivity and improved cognitive skills.

→ Natural ventilation is often not sufficient (if the outdoor air quality is poor, it can even be detrimental).

→ Forced (mechanical) ventilation is a must if we want to create a healthy work environment.

→ Ventilation is emerging as a crucial strategy to prevent the spread of coronavirus, requiring regular and professional maintenance services.



Indoor ventilation: How important is it?

Unfortunately, air quality is often neglected when building or renovating offices. Why? A good ventilation system represents a considerable cost, sometimes up to 30% of the total investment.

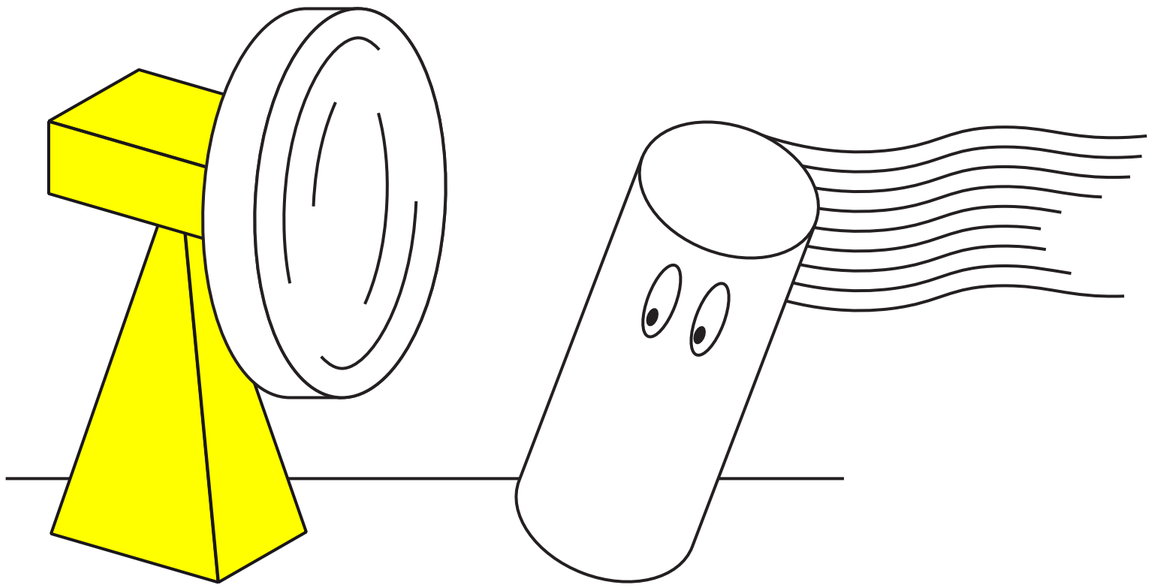
Studies from top-notch universities and labs suggest that any savings you'll make on the ventilation will come back to haunt you. In contrast, if you invest in healthy air in the workplace, you can expect the following:

Increased productivity
A study conducted at Harvard tested employee performance in work environments with "healthy" and "unhealthy" air. The results showed that the productivity of those who worked in spaces with good ventilation was at least 8% higher compared to their peers working in badly ventilated offices.[1]

Less sick leave and absenteeism
Healthy indoor air experience can reduce absence from work for up to 35%.[2]

Improved cognitive abilities
By reducing carbon dioxide, the employees' cognitive skills significantly improve, benefiting productivity and work performance.

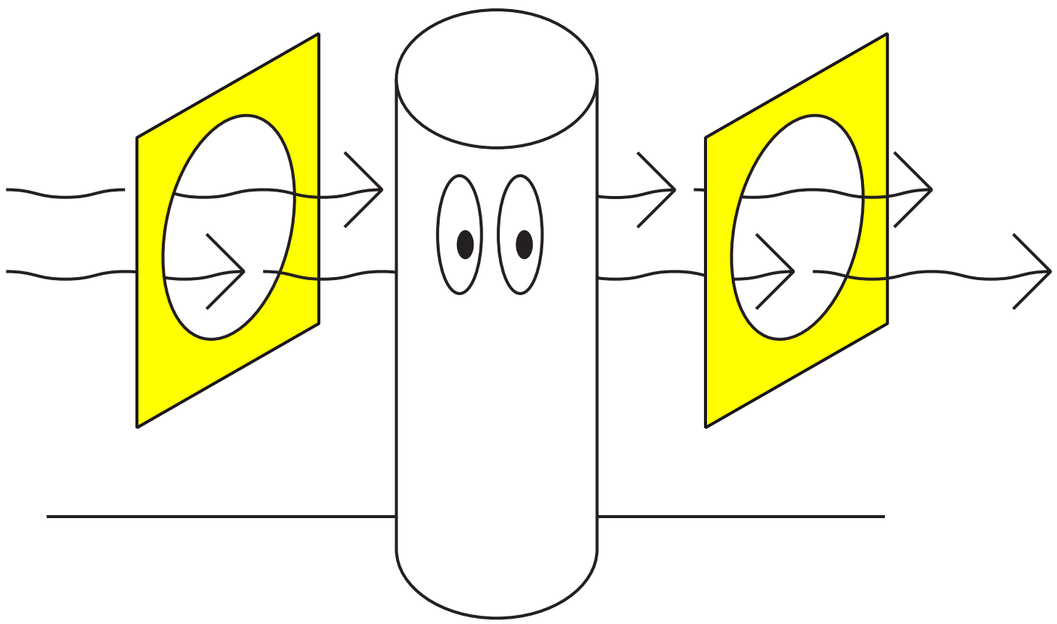
What is a tell-tale sign that your indoor ventilation is not good? The following symptoms can signal that the air is unhealthy: fatigue, dizziness, dry cough, headaches, poor ability to concentrate. This is known as the Sick Building Syndrome.



1. MacNaughton P, Pegues J, Satish U, Santanam S, Spengler J, Allen J. 2015. Economic, Environmental and Health Implications of Enhanced Ventilation in Office Buildings. International Journal of Environmental Research in Public Health. 12(11):14709-14722.

2. Report: The World Green Building Council: Doing Right by Planet and People: The Business Case for Health and Wellbeing in Green Building. Available at: https://www.worldgbc.org/access-report

How can you achieve better air quality?



To sum it up, the air needs to circulate. We all know about natural ventilation or opening windows at regular intervals to let the fresh air in. However, this option is not always great (e.g., when the outdoor air quality is low or there is a lot of noise). Also, in the winter, we can lose heat by constantly opening windows.

Therefore, forced (mechanical) ventilation is often a better strategy to ensure healthy air. When buildings are built as an investment, forced ventilation is often not included in the planning. On the other hand, when the owner intends to use the building, forced ventilation is rarely forgotten. That says a lot, doesn't it?

The main advantages of forced ventilation are superior air quality and high ROI. Modern windows that seal well are a prerequisite for forced ventilation. There are different types of mechanical ventilation available on the market, for instance:

Vacuum system
Stale internal air is extracted from the building by an exhaust fan. The pressure inside the building is slightly lower than the outside air.

Pressure system
Fresh outside air is blown into the building by inlet fans. The internal air pressure is slightly greater than the outside air.

Local exhaust system
Extracts local sources of heat or contaminants at their source.

In low-energy buildings, mechanical ventilation is the most efficient way to ensure good air quality.

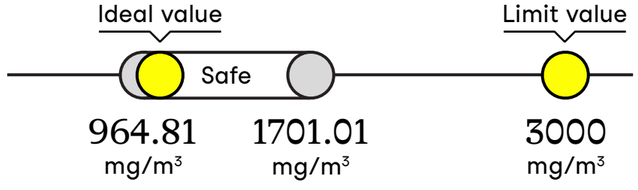
Indoor air pollutants

In some buildings, the ventilation is designed so that the air repeatedly circulates. Instead of breathing in fresh air, office workers inhale air high in CO_2, which can have a direct impact on their productivity and well-being.

If the levels of fresh air are higher and the levels of CO_2 lower, we can expect higher productivity and better well-being of our employees.

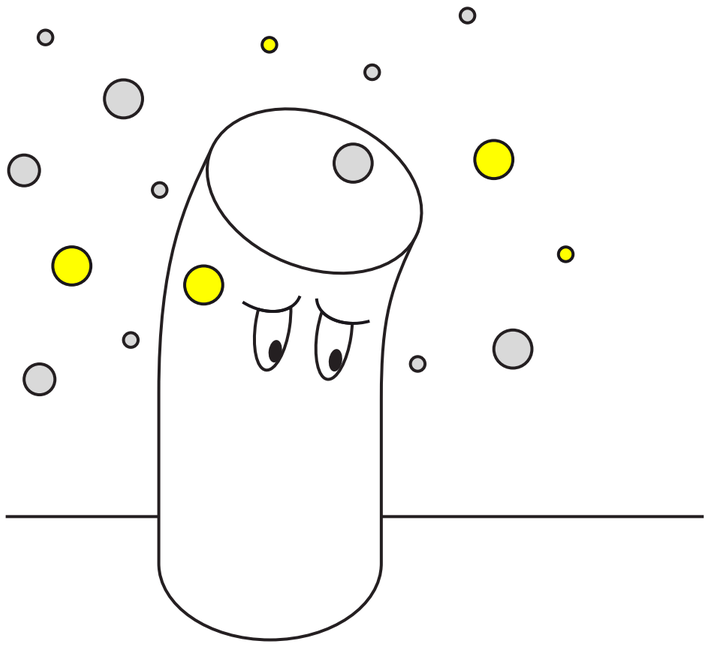
Quantity of fresh air per person indoors

Safe levels of Co_2 indoors

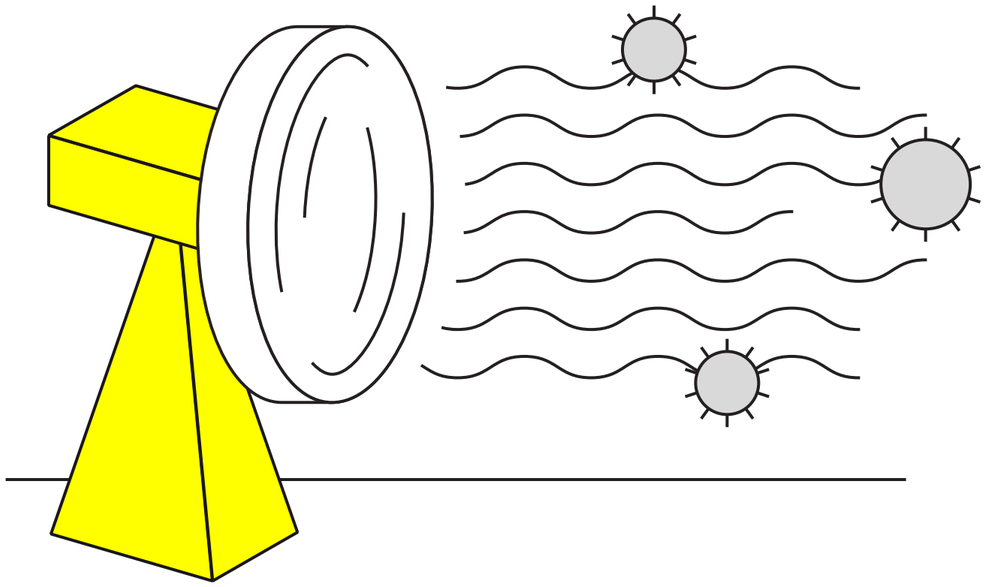


Safe levels of indoor air pollutants

Pollutant	Abbrev.	Safe level	Unit
Carbon dioxide	CO_2	3000	mg/m^3
Radon	Rn	400	Bg/m^3
Ammonia	NH_3	50	$µg/m^3$
Formaldehyde	H_2CO	100	$µg/m^3$
Volatile organic compounds	VOC	600	$µg/m^3$
Carbon momoxide	CO	10	$µg/m^3$
Ozon	O_3	100	$µg/m^3$
Indoor particulate matter	PM_{10}	100	$µg/m^3$



Ventilation in the times of coronavirus



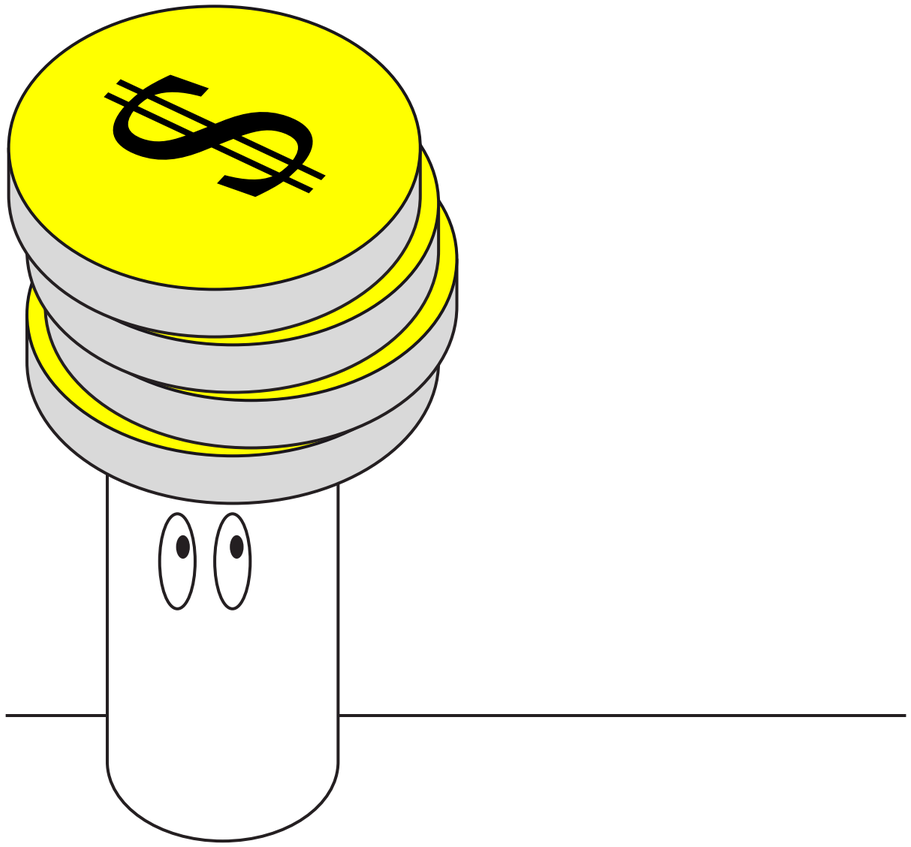
Experts have established that ventilation could be an important factor in the spread of COVID-19. For instance, the infectious particles could be more easily dispersed in indoor environments. Therefore, it's vital to avoid horizontal air movement in offices.

We also need to pay attention to the filters. They should be cleaned and replaced regularly. We expect that professional maintenance of ventilation systems (using smart technology) will become even more important in the near future.

Can viruses be removed from the air? The only filters that can catch viruses from indoor air are HEPA filters.[3] However, they can't remove all small particles. It has been suggested that ultraviolet light should be used in conjunction with the filters. Since we are dealing with complex (and expensive) solutions, the jury is still out on the best and safest procedure. Stay tuned!

3. NASA report: Submicron and Nanoparticulate Matter Removal by HEPA-Rated Media Filters and Packed Beds of Granular Materials . Available at: https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20170005166.pdf

Is healthy air one of the best ROI for your company?



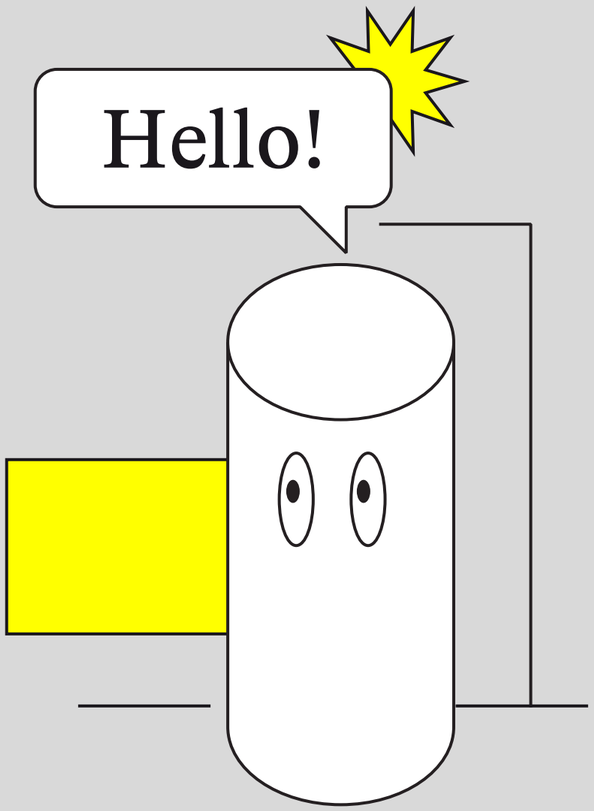
There is ample evidence that good air quality pays off. The previously mentioned Harvard study showed a strong correlation between air quality and productivity. Research team, led by Dr Joseph Allen, calculated that the performance of employees who worked in healthy air improved and was equivalent to $6,500 (5.500 €) increase in productivity per person per year.

There were some additional costs for enhancing ventilation, but they were trivial. Worst case scenario, the expenses came to 34€ per person per year and could be as little as 1€ per person per year in an energy-efficient building.

Already small changes to your indoor work environment can make a big difference for employee performance and well-being.

Still not sure?

For any additional questions, please contact our experts at CAMAC Space. We will be happy to find the best solution for your unique (ventilation) needs.



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