FAQ

1. Impact on health

1.1. What effects does poor indoor air quality have on health?

In one of its publications, the Superior Health Council lists the most frequently reported health problems associated with poor air quality. They include:

- respiratory symptoms,
- fatigue,
- allergies,
- irritation of the mucous membranes,
- irritation of the eyes,
- skin irritation,
- headaches,
- dizziness.

International research also links exposure to poor air quality with a number of diseases such as:

- asthma (and asthma symptoms);
- lung cancer;
- cardiovascular disease (CVD);
- upper and lower respiratory tract infections/symptoms;
- acute poisoning.

(IAIAQ, 2011).

2. Ventilation

2.1. How can ventilation stop the spread of viruses?

When we breathe, speak, cough or sneeze, we emit a larger or smaller amount of water droplets in the air we exhale. If we are infected by viruses or microbes, these droplets are loaded with them.

The largest drops fall very quickly onto surfaces and the ground, but can contaminate people in close proximity, which is why it is important to maintain a certain physical distance between people, wear a mask and respect barrier gestures.

The finer drops or micro-droplets, on the other hand, remain suspended in the air for several hours; these are called "aerosols".

In a room, these aerosols gradually spread throughout the space. Their diffusion is comparable to that of perfumes or cigarette smoke.

The higher the concentration of aerosols in a room, the higher the risk of contamination.

2.2. Are there threshold values above which viruses can no longer spread?

There is no threshold value for ventilation rate, air change rate or CO_2 concentration at which the risk of contamination can be excluded.

The more intense and regular the ventilation, the lower the risk.

This is why we must strive to achieve a CO_2 concentration rate indoors that is comparable to that of the outside air (i.e. approximately 400 ppm).

A room is considered well ventilated if the CO_2 concentration is less than 900 ppm (or 500 ppm above the outdoor concentration).

In the context of a health crisis such as COVID-19, this value is socially acceptable for limiting the spread of the virus by aerosols.

In practice, if the flow rate is 40 m^3/hour per person, an adult engaged in gentle activity will almost never exceed 900 ppm (or 500 ppm above the outdoor concentration). This minimum ventilation rate is higher for intense activities, since the production of CO_2 and the production of aerosols (and therefore the breathing of these aerosols) are then higher.

2.3. Is ventilation a good idea in these times of high energy prices?

Energy consumption remains an important point of attention. Maintaining a threshold below 1,200 ppm and 25 m^3/h, for example, does not result in a large increase in consumption PROVIDED that the ventilation is adapted to the number of people in the room and/or the measured CO_2 concentration.

From an energy point of view, it is beneficial to have, if possible, a system with heat recovery and a demand control system. The demand control system automatically increases and decreases the ventilation rates depending on whether there are more or fewer people in the room.

2.4. Are there any quality criteria for ventilation systems?

There are no specific technical or quality requirements for ventilation systems.

Marketing criteria have been determined for air purification systems but not for mechanical ventilation equipment.

However, attention should be paid to the equipment's acoustics, as it is important to avoid "cutting off" the mechanical ventilation in the rooms because the noise is considered excessive. However, if the facility is shut down during operations, the CO_2 concentration should be monitored to ensure that it remains within recommended limits (below 900 ppm if possible and not exceeding 1,200 ppm).

3. CO_2 meters

3.1. What is a CO_2 meter? Is it the same thing as a CO_2 sensor or an indoor air quality meter?

A CO_2 meter is a device that measures the concentration of CO_2 in a given space. All these names refer to the same type of air measurement device.

The use of this meter helps to protect the population against the risks of contamination in confined spaces, as the dispersion of aerosols that may contain viruses (such as COVID-19) can be particularly high there.

3.2. Why is it useful to measure CO_2 in indoor spaces?

Measuring the concentration of viral particles in the air is complicated. CO_2, which we also emit when we breathe, is much easier to detect and measure.

Measuring the concentration of CO_2 in the air is a good indicator of the ambient air quality in an enclosed space; a high concentration of CO_2 shows that the ventilation is insufficient in this space and that the air quality is not good. To maintain healthy air quality and reduce the risk of being contaminated by aerosols, it is necessary to aerate and ventilate to replace the air in enclosed spaces.

A high concentration of CO_2 in an enclosed space does not necessarily mean that the air is loaded with viruses. Measuring the CO_2 level makes it possible to detect reference thresholds above which the air in the room must be replaced. **Ideally, the level of CO_2 in the air should not exceed 900 ppm.** Some scientific studies have shown that above a concentration of 1,000 ppm, CO_2 has effects on human performance (particularly intellectual performance) and that it is preferable to remain below this threshold.

The natural CO_2 concentration of the outside air is an average of 400 ppm. Ideally, it should be close to this threshold in enclosed spaces.

CO_2 meters measure the CO_2 content of a room. They do not act as a ventilation or aeration device.

3.3. What are the legal requirements for a CO_2 meter?

CO_2 meters are authorised for sale if they:

1. **directly measure the CO2 concentration or meet standard EN 50543;**

   It is important that CO2 sensors measure the CO2 concentration directly and do not estimate the CO2 concentration by measuring other parameters such as VOCs (volatile organic compounds). Devices that measure CO2 indirectly often indicate $CO_{2,eq.}$ If the devices do not measure CO2 directly, they must meet standard EN 50543 to guarantee acceptable accuracy.

2. **cover measurement ranges for CO_2 concentration from 0 to at least 2,000 ppm**

   CO_2 meters must be designed to correctly measure this CO_2 concentration range. When using an air purifier, it is advisable to use a sensor with a range of up to 5,000 ppm to take into account the fact that air purification does not remove CO_2.

3. **are designed to be recalibrated to compensate for measurement drift in accordance with the procedures laid down by the manufacturer in the instrument's technical manual**;

   For technical reasons, a CO_2 meter does not remain stable over a long period. The measurement gradually deviates from the real value. The device must therefore be recalibrated according to the manufacturer's procedure. This requirement does not apply to CO_2 meters with a self-calibration system.

4. **measure a CO_2 concentration with an error of a maximum of 10% of the measurement.**

   Example: a 10% error on a displayed value of 900 ppm corresponds to ± 90 ppm. This means that the real value is between 810 and 990 ppm.

   The 10% threshold is the permissible error. Every measuring device has a measurement error.

5. **are supplied with a technical manual that specifies the installation conditions for correctly measuring the CO_2 concentration in a given space.**

Only CO_2 meters that meet all these criteria can be labelled as "*SARS-CoV-2-ready*". This statement can be placed directly on the device, its packaging or in the technical manual.

These criteria are those defined in the ministerial decree of March 2022.

3.4. How to choose a CO_2 meter? What should I look out for?

Please note that it is important to purchase CO_2 meters that meet the requirements defined in the ministerial decree. Buying another type of device does not guarantee correct measurements and makes the planned ventilation and air purification measures completely ineffective.

In addition, publications with practical recommendations facilitate:

- the choice of device : "Selection and use of CO2 sensors during COVID-19".
- the introduction of measures for monitoring indoor air quality : "Recommendations for the Practical Implementation of Ventilation and Air Quality Monitoring during COVID-19"

4. Air purifiers

4.1. What is an air purification device?

An air purification device is a system that captures microorganisms in the air and/or inactivates some of the microorganisms it contains. It then provides air that is decontaminated and, therefore, potentially purified of pollutants (such as fine particles).

There are two main categories of devices based on:

- **capture**: capture of particles potentially containing the virus (HEPA filter, electrofilters);
- **inactivation**: damage to all or some of the microorganisms in an air stream, so that they can no longer multiply or propagate (e.g. UV-C).

Efficiency and safety requirements were set out in a ministerial decree in May 2021. This decree has since been extended until 29 May 2022.

List of all the purification devices authorised by the FPS Health to be placed on the market.

4.2. Why is the use of an air purifier recommended?

The use of air purification systems, in addition to ventilation, further reduces the risk of contamination.

When the CO_2 meter indicates that **the value of 1,200 ppm CO_2 has been exceeded**, it is strongly recommended to increase ventilation and/or use a recognised air purification system. The use of an air purifier is therefore recommended, but not mandatory.

The use of an air purification device can be useful when the targeted ventilation rate cannot be achieved for practical reasons. It can also be used as an additional device in a space that is already sufficiently ventilated.

List of all the purification devices authorised by the FPS Health to be placed on the market.

4.3. Why install a purification system if it does not lower CO_2 concentrations?

The use of this type of device makes it possible to purify indoor air and improve its quality. Clean air guarantees a lesser presence of biological contaminants (moulds, bacteria and viruses) and possibly also chemical contaminants (particles, formaldehyde that can be released from furniture or floor coverings, etc.). See on this subject: Indoor air pollution: we are all exposed to it!

Aerating, ventilating, purifying and treating the air help limit the spread of these contaminants as explained in the short video by the SPF Employment: Ventilate - YouTube

4.4. Are air purification systems that are not on the FPS list allowed?

Devices purchased before 28 May 2021 are allowed. New devices must be selected from the FPS list. Manufacturers and distributors can register a new device by submitting the necessary evidence that the device works well and does not harm health. Data sheets must be requested from the manufacturer for air purification devices installed before 28 May 2021, such as tobacco smoke air purifiers. If the CADR is suitable for cigarette smoke, it will also have an effect on aerosols. A (fine) particle sensor can be used to monitor the correct operation of the device.

4.5. Can air purifiers used against tobacco smoke also be used for the prevention of respiratory diseases?

If the ventilation equipment is provided for under the law on the prohibition of smoking in certain public places,

the ventilation rate of these devices can be taken into account.

For air purifiers, the necessary technical information must be available or the data sheets must be requested from the manufacturer. These devices must be proven to be effective against airborne respiratory diseases and not cause any adverse effects because they contain ozone or because too many free radicals have been formed.

If the purification device is suitable for cigarette smoke, it will also have a positive effect on aerosols. It should be noted that the particles that make up smoke (PM 2.5 or less) are as fine as those in aerosols containing respiratory pathogens. Therefore, a purifier placed on the market before 12 May 2021 (Royal Decree of 12 May 2021) but capable of measuring a CADR of type PM 2.5 or a second hand smoke (SHS) flow, can also be used to prevent respiratory diseases. It is therefore advisable to read the documentation accompanying the device carefully to verify its performance levels. The use of these purifiers is recommended provided that the CADR (Clean Air Delivery Rate) value or the purified air flow rate mentioned in the documentation is used.

5 Measures recommended by the Corona Barometer

5.1. **Which sectors are covered by the recommendations of the Corona Barometer?**

The Corona Barometer is a communication tool developed by the government to facilitate understanding of the recommended measures for improving indoor air quality during the Covid-19 pandemic.

The Corona barometer was implemented from 28 January to 23 May 2022. It is therefore no longer applicable.

However, compliance with indoor air quality measures is strongly recommended for the well-being and health of all.

The recommendations of the Barometer apply to rooms and spaces that host the public in**:**

- establishments in the sports sector, including fitness centres;
- establishments in the events sector, including discos and dance halls;
- food and beverage establishments in the HORECA sector;
- infrastructures where recreational activities (sport-youth-culture) take place.

5.2. Where is it preferable to install a CO_2 meter(s) in these types of premises?

Ideally, the unit should be installed in:

- a prominent and central location;
- at least 1.5 m from people because the air they breathe out can influence the measurements.

Therefore, it should not be placed:

- next to a door, window or other opening that is open frequently or for long periods of time;
- near the ventilation system air intake.

5.3. Where is it best to display the CO_2 meter results to the public?

It is recommended that the CO_2 meter be installed in a location that is clearly visible to visitors, unless an alternative, publicly accessible, real-time display system is provided.

5.4. Is one CO_2 sensor per room enough?

It is recommended that at least one unit be installed in areas where:

- food or drinks are prepared and served;
- people smoke;
- sport is practised;

- an event is held;
- films are shown (cinemas);
- queues can form;
- people get undressed (changing rooms).

CAUTION: If two units installed in the same space in an area frequented or likely to be frequented by the public show very different concentrations, this may be the result of a build-up of stale air in certain areas.