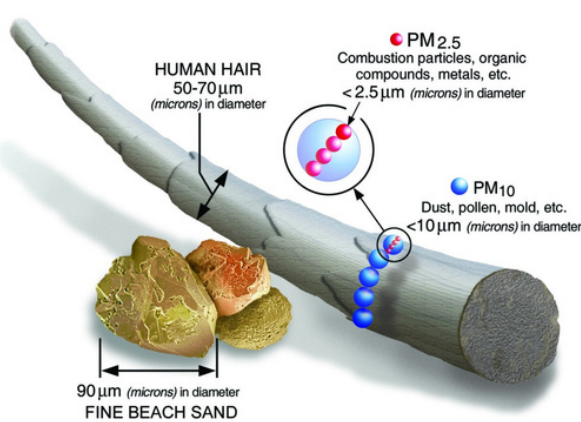airgradient

Air Quality Monitor Cheatsheet

Hey! Those numbers on your air monitor might seem like a cryptic code, but they can actually unlock a wealth of information about the air you breathe.

This quick guide will help you decode those numbers and understand what they mean for your health.

Particulate Matter (PM)

Key Take-Aways:

- **Small particles** in the air, especially below 2.5 µm (0.0025 mm) are dangerous and can cause all kinds of **serious long term health consequences**. In heavy polluted countries, people can lose up to ten years of their life expectancy due to pollution.
- There are conflicting indexes and colors used across different countries. Make sure you know the PM2.5 value in **µg/m³**.
- **There are no safe levels of PM**. It should be as low as possible. The WHO recommends below 5 µg/m³ annual average.
- Use **HEPA based** air purifiers indoors or **N95** masks outdoors to reduce your exposure.

HUMAN HAIR
50-70µm
(microns) in diameter

PM2.5
Combustion particles, organic compounds, metals, etc.
< 2.5µm (microns) in diameter

PM10
Dust, pollen, mold, etc.
<10µm (microns) in diameter

90µm (microns) in diameter
FINE BEACH SAND

source: US Environmental Protection Agency

World Health Organisation:
Keep annual PM2.5 below 5 µg/m³
The closest to zero the better.

AQLI Air Quality Life Index®

Air Quality Life Index (AQLI). Find out how much life expectancy you loose due to PM air pollution.

Carbon Dioxide (CO2)

Key Take-Aways:

- **Carbon dioxide (CO2)** is a gas in our atmosphere and the **outside concentration is at around 430ppm**.
- When **we breath, we exhale CO2** and thus the concentration can increase in occupied rooms quite quickly.
- High levels of CO2 can cause **headaches** and also i**mpact our brain's performance**.
- To **reduce** the CO2 concentration, you can **open windows** or increase the fresh air rate of your HVAC system.
- Please note that normal wall based A/C systems do not reduce the CO2 concentration as they only circulate the indoor air.
- Most CO2 sensor do an **automatic baseline calibration (ABC)**. For these to work correctly, the room needs to be **ventilated frequently**, e.g. once a week. If this does not happen, these sensor might show too low readings.
- Make sure your CO2 sensor uses NDIR technology, as this type of sensors measure C02 directly and accurately.

🟢 **Excellent <** 801 ppm

🟡 **Acceptable** 801 - 1000 ppm

🟠 **Not Ideal** 1001 - 1500 ppm

🔴 **To be avoided** 1501 - 2000 ppm

🟣 **Unhealthy** 2001 - 3000 ppm

🟤 **Very Unhealthy** > 3000 ppm

VOCs (Volatile Organic Compounds)

Key Take-Aways:

- There are **more than 10.000 VOCs in the air**. Some **extremely harmful, some harmless**. Both trigger VOCs values. So it is very important to know the specific VOC to make any judgement.
- Old VOC sensors in some air monitors were tested in special lab settings using just one type of alcohol (ethanol). This doesn't reflect real-world air, where many different VOCs exist. So, the **numbers these sensors show might not tell you exactly how much harmful VOCs are actually in your air.**
- More modern sensors now focus on the the **VOCs change** in e.g. the last 24h rather than absolute concentrations.
- If you **observe spikes** over the day and you can **identify the source**, you can try and **reduce** these chemicals.

SOURCE OF VOC IN YOUR HOUSE

Copiers & Printers
Clues & Adhesive
Permanent Markers
Hobby supplies

Detergent
Cleansers
Aerosol sprays

Synthetic carpets
& rugs
Air fresheners &
plug-in diffusers

Burning food
& oils
Oven &
Toasters
Gas stoves

Paint & Varnish
Furnishing
Air fresheners &
candles

More details on our blog about VOCs:
https://www.airgradient.com/blog/tvoc-explainer/

Nitrogen Oxides (NOx)

Key Take-Aways:

- **NOx** is the sum of **nitric oxide (NO) and nitrogen dioxide (NO2)**. These two pollutants have similar properties and are involved in many of the same chemical processes in the atmosphere.
- Exposure to NOx is associated with **cardiovascular diseases, asthma, diabetes mellitus, hypertension, stroke and chronic obstructive pulmonary disease (COPD)**.
- NOx is generated by combustion **engines** (cars, trucks, ships, aircrafts, industries). Therefore, it is a particular problem in **urban areas**. But also agricultural activities and some natural phenomena may generate it.
- NOx also contributes to the formation of **smog, acid rain, and ground-level ozone.**

The **AirGradient NOx sensors** don't measure absolute NOx levels but **changes in the NOx concentration** (index). This can **help you identifying (and avoiding) emission events** such as rush hours.

AirGradient Open Air - The Climate Change Monitor