CARBON DIOXIDE

Carbon dioxide (CO_2) gas is harmless at low levels, but is toxic at large concentrations.

How is CO_2 measured?

CO_2 concentration is measured in parts per millions (ppm).

Typical indoor CO_2 levels are between 800 and 1,000 ppm.

Why do indoor CO_2 levels rise?

The average person exhales 2.3 pounds of CO_2 per day. Indoor CO_2 also increases when you:

- Cook
- Exercise
- Host gatherings

How much CO_2 is too much?

Indoor CO_2 concentrations greater than 1,000 ppm can cause significant cognitive impairment.

How does CO_2 affect my health?

CO_2's effect on your health depends on the concentration:

<1,000 ppm	Recommended indoor levels based on US guidance.
1,000-20,000 ppm	Cognitive impairment, emotional irritation, and sleep disruption.
>20,000 ppm	Headaches, nausea, visual and hearing impariment, and suffocation. This exposure level is potentially fatal.

How can we lower indoor CO_2 levels?

1. **Open windows to let in fresh air.**

2. **Install energy-efficient appliances.**

3. **Invest in smart HVAC systems for homes and office buildings.**

RADON

Radon is a colorless, odorless, radioactive gas that is carcinogenic in large concentrations.

How is radon measured?

Radon concentration is measured in becquerels per cubic meter (Bq/m^3).

Typical indoor radon exposure is between 50 and 100 Bq/m^3.

Why do indoor radon levels rise?

Radon is naturally present in soil. Worldwide, soil releases nearly 34 pounds of radon every year.

Its concentration increases when it leaks into confined, poorly ventilated spaces.

How much radon is too much?

Indoor radon concentration should be kept as low as possible. Every 100 Bq/m^3 increase raises lung cancer risk by about 16%.

How does radon affect my health?

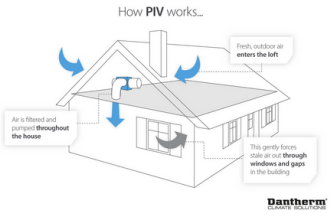
Radon's effect on your health depends on the concentration:

<100 Bq/m^3	Typical indoor exposure.
100-1,000 Bq/m^3	Measurably elevated lung cancer risk per 100 Bq/m^3.
>1,000 Bq/m^3	Background lung cancer risk is doubled.

How can we lower indoor radon levels?

1. **Use smart radon sensors.**

2. **Install a positive input ventilation system.**



3. **Seal your floors and walls.**

PARTICULATE MATTER

Particulate matter refers to microscopic particles in the air that are hazardous to breathe.

How is particulate matter measured?

Particulate matter is measured in either particle mass or number per volume of air.

There is no safe level of indoor particulate matter.

Why do particulate matter levels rise?

Particulate matter levels increase whenever small particles scatter into the air. Some examples include:

- Construction
- Cooking
- Wild fires

How much particulate matter is too much?

There is no safe particulate matter concentration. Some particles, however, are more dangerous than others. The danger posed by a particle depends on its:

- Size
- Shape
- Solubility

How does particulate matter affect my health?

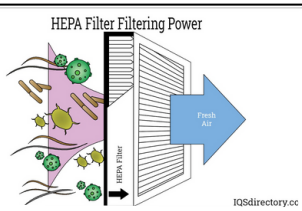
Particulate matter can cause myriad problems, such as:

- Heart and lung disease
- Psychological problems
- Various cancers

How can we lower indoor particulate matter levels?

1. **Use indoor plants to reduce air pollution.**

2. **Install HEPA filters to remove particles from the air.**



3. **Add trickle vents for constant ventilation.**