BREVIAR TEORETIC

1. Concentrație

as grams per 1,000 liters, which may be converted to milligrams per liter (mg/L). Therefore, 1 g/m^3 = 1 mg/L = 1 ppm. Likewise, one milligram per cubic meter (mg/m^3) is the same concentration in water as one microgram per liter (ug/L), which is about 1 ppb.

Concentrations in Air

Concentrations of chemicals in air are typically measured in units of the mass of chemical (milligrams, micrograms, nanograms, or picograms) per volume of air (cubic meter or cubic feet). However, concentrations may also be expressed as parts per million (ppm) or parts per billion (ppb) by using a conversion factor. The conversion factor is based on the molecular weight of the chemical and is different for each chemical. Also, atmospheric temperature and pressure affect the calculation.

Typically, conversions for chemicals in air are made assuming a pressure of 1 atmosphere and a temperature of 25 degrees Celsius. For these conditions, the equation to convert from concentration in parts per million to concentration in milligrams per cubic meter (mg/m^3) is as follows:

Concentration (mg/m^3) = 0.0409 x concentration (ppm) x molecular weight

To convert from mg/m^3 to ppm, the equation is as follows:

Concentration (ppm) = 24.45 x concentration (mg/m^3) ÷ molecular weight

The same equations may be used to convert micrograms per cubic meter (ug/m^3) to parts per billion (ppb) and vice versa:

Concentration (ug/m^3) = 0.0409 x concentration (ppb) x molecular weight

Or, concentration (ppb) = 24.45 x concentration (ug/m^3) ÷ molecular weight

Here is an example. The molecular weight of benzene is 78. If the concentration of benzene in air is 10 mg/m^3, convert to the units of ppm by multiplying 24.45 x 10 mg/m^3 ÷ 78 = 3.13 ppm.

Note: Sometimes you will see chemical concentrations in air given in concentration per cubic feet (ft^3) instead of concentration per cubic meter (m^3). The conversion from cubic feet to cubic meter and vice versa is as follows: 1 ft^3 = 0.02832 m^3 and 1 m^3 = 35.31 ft^3.

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2. Valori

400ppm 0.04%	Normal outdoor air
400-1,000ppm 0.04-0.1%	Typical CO2 levels found indoors
1,000-2,000ppm 0.1-0.2%	Common complaints of drowsiness or poor air quality
2,000-5,000ppm 0.2-0.5%	Headaches, fatigue, stagnant, stuffiness, poor concentration, loss of focus, increased heart rate, nausea
> 50,000ppm > 5%	Toxicity due to oxygen deprivation occurs
> 100,000ppm > 10%	Oxygen deprivation in seconds: convulsions, coma, and death

3.Calcul

$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)$$

Our aim is to measure the resistance of the sensor in clean air (R0). As shown, measuring the resistance between the A0 pin and GND would give us the value of resistor R2. R0 here creates a voltage divider with R2. Hence, if we can measure the output voltage at A0 in clean air, R0 is:

$$R0 = \frac{R_2(1 - A_0)}{A_0}$$

Using an ohmmeter, measure the resistance between the A0 and GND to acquire R2. For example, the R2 on my module is approximately 1000 ohms.

$$R_S = \frac{R_2(1 - A_0)}{A_0}$$

We use this value in the previous formula to get the concentration of acetone in PPM.

Unde:
x=concentrație
$y=R_s/R_0$
R_2=rezistență potențiometru

Surse:
https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.files/fileid/14285
https://www.co2meter.com/blogs/news/carbon-dioxide-indoor-levels-chart#:~:text=General%20indoor%20environments%3A%20In%20most,%2C%20offices%2C%20and%20public%20spaces
.https://www.teachmemicro.com/mq-135-air-quality-sensor-tutorial/