

# Environmental Technology in Mining

## CHAPTER I. MINE GASES

### 1. Introduction to mine gases



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# The Ideal Gas Law Equation

$$P \cdot V = n \cdot R \cdot T$$

P = Pressure in atm.

V = Volume in litres.

n = moles (mass (g) / Molecular Weight (MW)).

R = Gas constant (0.082 L · atm / (K · mol))

T = Temperature in K.

## Density of a Gas

$$\rho = \frac{P \cdot MW}{R \cdot T}$$

## Units to express concentration of gases

% = Percentage in terms of volume

ppm = parts per million (in terms of volumen).

mg/m<sup>3</sup> = mass / volume

# Concentration (C) units conversion

1 % = 10,000 ppm

1 ppm =  $10^{-4}$  %

$$C_{ppm} = C_{mg/m^3} \cdot \frac{R \cdot T}{P \cdot MW}$$

At 25°C and 1 atm

ppm =  $mg/m^3 \times 24.45 / MW$

$mg/m^3 = ppm \times MW / 24.45$