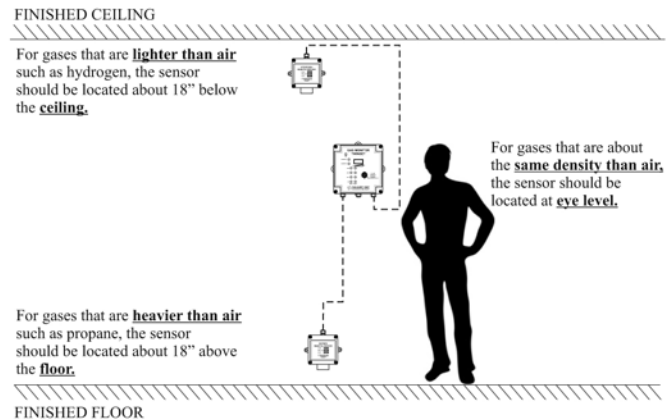


## Gas Monitoring 101

Outside of air, all gases are dangerous to various degrees. Some gases will explode, some gases are very toxic and some gases are both. For that later case, we want to detect those molecules at their toxicity levels as they are all toxic way before they can burn.

Designing gas monitoring systems is not a complicated task when you know the basic principles. This page covers the most important topics that will lead to a safe and performing gas monitoring system.



## How Do We Determine Alarm Levels & Where Do We Install the Sensing Element?

### Threshold Limit Value - Time Weighted Average (TLV-TWA)

Refers to the time-weighted average concentration for a normal 8 hour workday and a 40 hour workweek to which nearly all worker may be repeatedly exposed, day after day, without adverse effect.

### Threshold Limit Value - Short Term Exposure Limit (TLV-STEL)

TLV-STEL is the maximum concentration of a sub for (a) a continuous 15-minut exposure period, (b) for a maximum of 4 such periods per day, (c) with at least on 60-minute exposure-free period between two exposure periods, and (d) provided the daily TLV-TWA is met.

### Lower Explosive Limit (LEL)

The minimum concentration of a particular combustible gas or vapor necessary to support its combustion in normal ambient air. Below this level, the mixture is too lean to burn.

## Detection Ranges & Alarm Levels

Typical Gases	Full Scale Range	First Alarm Level (Factory Default)	Second Alarm Level (Factory Default)	Sensor Location
T Ammonia	0-100 ppm	25 ppm (TLV-TWA)	35 ppm (TLV-STEL)	Ceiling or Eye Level
T Carbon Dioxide	0-50,000 ppm	5,000 ppm (TLV-TWA)	30,000 ppm (TLV-STEL)	Floor or Eye Level
T Carbon Monoxide	0-500 ppm	25 ppm (TLV-TWA)	35 ppm (TLV-STEL)	Eye Level
T Chlorine	0-10 ppm	0.5 ppm (TLV-TWA)	1 ppm (TLV-STEL)	Floor
C Hydrogen	0-100% LEL	1% in Air (25% LEL)	2% in Air (50% LEL)	Ceiling
T Hydrogen Sulfide	0-50 ppm	10 ppm (TLV-TWA)	15 ppm (TLV-STEL)	Floor
C Methane	0-100% LEL	1.25% in Air (25% LEL)	2.5% in Air (50% LEL)	Ceiling
T Nitrogen Dioxide	0-10 ppm	3 ppm (TLV-TWA)	5 ppm (TLV-STEL)	0-10 ppm
O Oxygen (Low & High Mode)	0-25% in Air	19.5% (Low Level)	23.5% (High Level)	Eye Level
O Oxygen (Depletion Mode)	0-25% in Air	19.5% (Low Level)	18% (Very Low Level)	Eye Level
C Propane	0-100% LEL	0.5% in Air (25% LEL)	1% in Air (50% LEL)	Floor

T = Toxic Gas

C = Combustible Gas

O = Oxygen (for Inert Gases Always Use an Oxygen Monitor)



MECHANICAL VENTILATION



WARNING DEVICES



AUTOMATIC SHUTOFF VALVES



POWER CUTOFF



FIRE ALARM PANELS