



# CONFINED SPACE ENTRY

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# HAZARDOUS ATMOSPHERE

## 29 CFR 1910.146(b)

Means an atmosphere that may expose employees to risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, and, or acute illness from one or more of the following;

1. Flammable gas, vapor, or mist in excess of 10% of its **Lower Flammable Limit (LFL)**;
2. Airborne combustible dust that meet or exceeds its **Lower Flammable Limits (LFL)**

3. Atmospheric oxygen concentration below 19.5% or above 23.5%;
4. Atmospheric condition of any substance for which a dose or a **PEL** (**P**ermissible **E**xposure **L**imit) is published in subpart G and Z of 29 CFR 1910, which could result in an employees exposure in excess of its dose or permissible limits
5. Any other atmospheric condition that is **IDLH** (**I**mmediately **D**angerous to **L**ife and **H**ealth)

# OXYGEN

## THE NUMBER 1 KILLER

The ambient, or normal, atmosphere is composed of 20.9% oxygen, 78% nitrogen, and 1% argon with small amounts of various other gasses mixed in at small amounts.

23.5% HIGH ALARM (FLAMMABLE)

20.9% NORMAL

19.5% LOW ALARM

17.0% LOSS OF NIGHT VISION INCREASED  
BREATHING VOLUME ACCELERATED  
HEARTBEAT

14%-16%      Physiologic effects are increased breathing volume, rapid heartbeat, poor muscular coordination, fatigue, and intermittent respiration.

6%-10%      Nausea, vomiting, inability to perform and unconsciousness. Death in minutes

# FLAMMABLE ATMOSPHERE

## LEL / LFL

The **L**ower **E**xplosive or **L**ower **F**lammable **L**imits are terms that are synonymous with each other. This is the lowest level of gas or vapor in air that will support combustion.

## UFL / UEL

The **U**pper **F**lammable and **U**pper **E**xplosive **L**imits. The highest level of gas or vapor that will support combustion.

Our portable air monitors read in % LEL not % by volume.

### EXAMPLE:

Methane 5% of the space is filled with methane. When you lower your portable air monitor in, the reading will be 100% LEL. The lowest level of methane in air that will support combustion.

GAS MIXED IN AIR:

LFL / LEL

UFL / UEL

METHANE (CH<sub>4</sub>)

5%

15%

BENZENE (C<sub>6</sub>H<sub>6</sub>)

1.2%

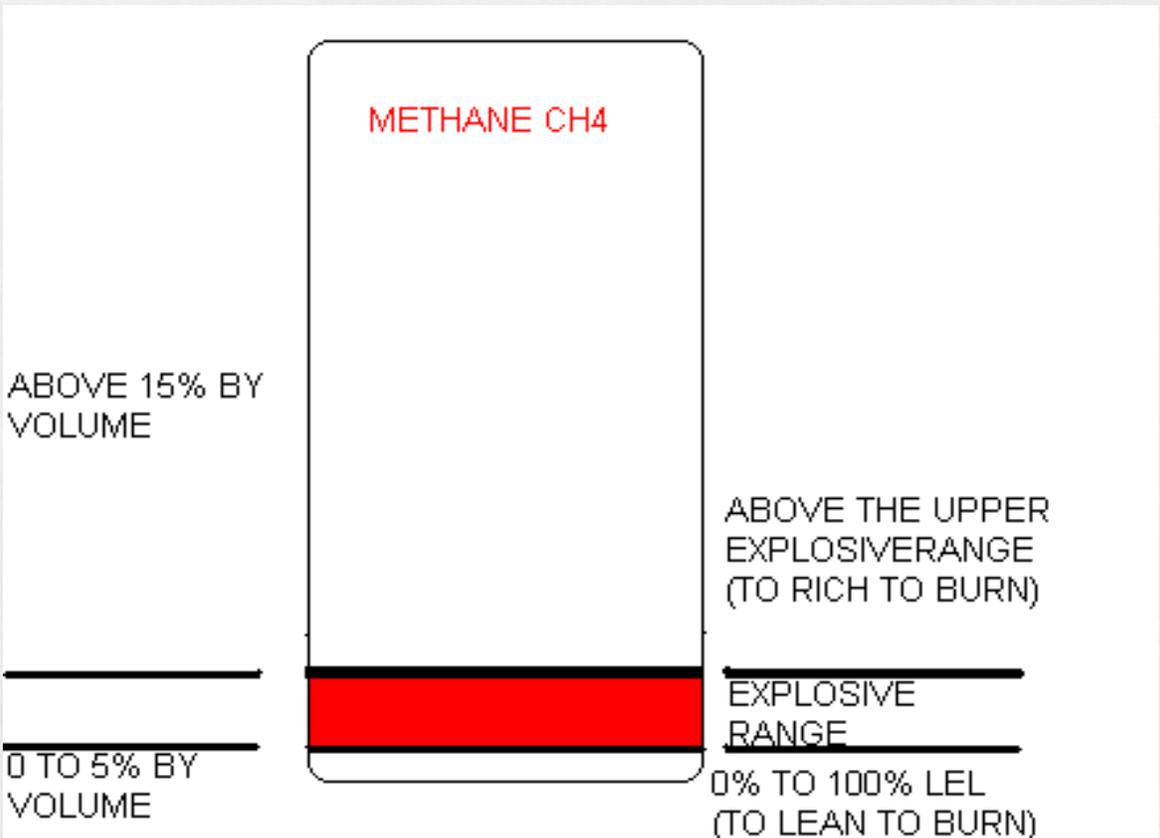
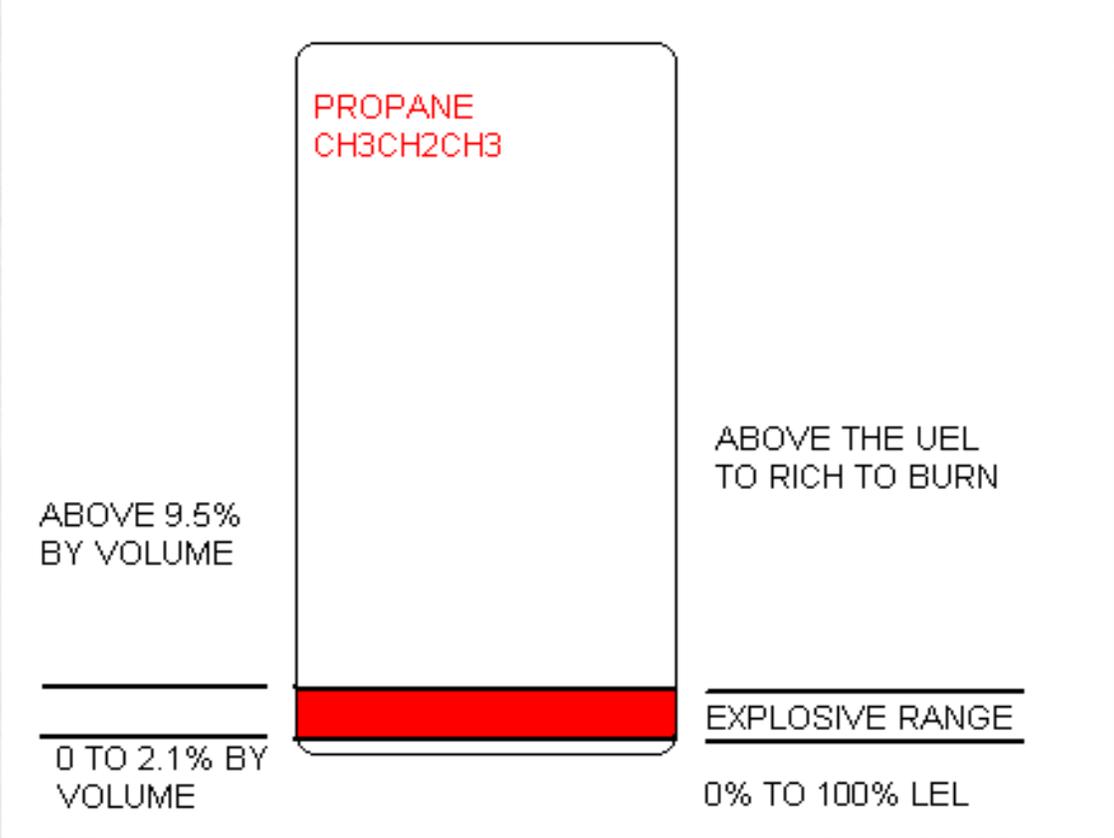
8%

PROPANE (CH<sub>3</sub>CH<sub>2</sub>CH<sub>3</sub>)

2.1%

9.5%

# 0% LEL is good – 10% LEL Contact Supervisor



ABOVE 74% BY VOLUME

CARBON MONOXIDE  
CO

ABOVE THE UEL  
TO RICH TO BURN

EXPLOSIVE RANGE

0 TO 12% BY VOLUME

VARY TOXIC

0% TO 100% LEL  
TO LEAN TO BURN

VERY TOXIC

VERY TOXIC

ABOVE 44% BY VOLUME

HYDROGEN SULFIDE  
H<sub>2</sub>S

ABOVE THE UEL  
TO RICH TO BURN

EXPLOSIVE RANGE

0 TO 4% BY VOLUME

VARY TOXIC

0% TO 100% LEL  
TO LEAN TO BURN

# TOXIC

IT'S THE DOSE THAT MAKES POISON

MEASURED IN  
PPM (PARTS PER MILLION)

- ONE INCH IN 16 MILES
- ONE DOLLAR IN A MILLION
- ONE DROP IN 80 5th OF JACK DANIELS

# COMMONLY USED TERMS

**PEL** - Permissible Exposure Limit  
(usually the same as a TWA)

**TWA** - Time Weighted Average  
(8-hour average)

**STEL** - Short Term Exposure Limit  
(15 min. average)

**IDLH** - Immediate Dangers to Life and Health  
(no exposure)

**CARBON  
MONOXIDE**

**HYDROGEN  
SULFIDE**

TWA 35 PPM

10PPM

STEL 200 PPM

15 PPM

IDLH 1200 PPM

100 PPM

# SAMPLING

HIGH ALWAYS  
MEDIUM  
LOW

Once your confined space is deeper than eight feet, you will need to sample every four feet.

The sample time will vary from air monitor to air monitor. Look for response time (READ THE MANUAL) for the slowest sensor in your air monitor and use that as your sample time.

Calibration is the most important maintenance you can do to your air monitor. Before each use check the calibration date on your air monitor or in your calibration records. **(READ THE OWNERS MANUAL FOR CALIBRATION INTERVALS)**

When using a sample pump, don't forget to add the additional sample time for drawing the sample through the sample hose.

**(YES, THAT'S RIGHT, READ THE OWNERS MANUAL!)**

# AIR MONITORS

## READ THE OWNERS MANUAL

- WHAT GASSES WILL IT SEE
- WARM-UP TIME
- RESPONSE TIME OF SENSORS
- OPERATING TEMPERATURE RANGE
- WARRANTY
- CALIBRATION INTERVALS
- EASE OF CALIBRATION
- COST OF CALIBRATION
- WHAT TYPE OF SENSORS ARE IN THE UNIT
- LIFE EXPECTANCY OF SENSORS
- SIZE OF DISPLAY / READABILITY

- Background lighting
- Charging options
- Battery options
- Available options: lights / horns / pumps / remote display / vibrating / RS 232 PC Interconnect (data and calibration logging) / Customer support/ Parts availability / training by qualified instructor
- Durability

# Air Monitors

