

# Combustible Gas and Detection



## What is combustible gas?

Combustible gases are dangerous because if exposed to a fuel, oxygen and an ignition then an explosion is likely to occur. Each gas or vapor has a unique mixture of gas and oxygen; too much allows the gas to ignite while too little prohibits it. This involves the Lower Explosive Limit (LEL) and the Upper Explosive limit (UEL).

## Lower Explosive Limit (LEL) and Upper Explosive Limit (UEL):

Gas concentration between the LEL and UEL is considered combustible/explosive. The following figure describes this with the percentage referring to the percent of volume by air. For example, if a kitchen has 95% air and 5% cooking oil then there would be a high LEL level.



## Basic Operation of LEL Gas Detectors:

There are two types of sensors: electrochemical and catalytic. An electrochemical sensor typically works with oxygen, hydrogen sulfide or carbon monoxide. Oxygen is a sensor that needs to convert an element in order to display a reading such as lead into lead oxide. The other sensors do not need to do a conversion because they measure current while gas enters the system.

LEL sensors are catalytic sensors. This method involves flammable gas oxidation. This reaction continues to react with the platinum wire, causing an increase in temperature. While releasing heat there is an increase in resistance and a resulting decrease in current. This current is what the LEL sensors measure.

## Why are gas detectors important?

Gas detectors are important because they are the only way to be certain there is no gas leak. Often times, human senses are unreliable and even more so when the gas is colorless or odorless. Four common dangerous natural gases include methane, propane, butane, and carbon monoxide.

- If an odor is detected, it is important to not touch any electrical components because it can ignite a reaction. There are some important steps that should be done:
  1. Try to stay calm
  2. Turn off the gas if you know where it is coming from
  3. Open the doors and windows in order to let more air in and lower the concentration
  4. Leave the location
  5. Call for help



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