Airgas
an Air Liquide company

## INFORMATION FOR YOUR SAFETY

FYS

### Detection Terminology

**Calibration:** The process of adjusting the output of detector to give an accurate reading of gas concentration over its measuring range

**ppb:** Parts per billion, concentrations of gas in the atmosphere

**ppm:** Parts per million, concentrations of gas in the atmosphere

**vol or V/V:** Percent by volume, measurement of explosive gas concentration

**PID:** Photo Ionization Detection

**NDIR:** Non-Dispersive Infrared, uses principles of infrared light absorption for gas detection

**TWA:** Time Weighted Average

**STEL:** Short Term Exposure Limit, usually monitored over 15 minute periods

**RH:** Relative Humidity

## Guidelines for Choosing a Fixed Gas System

### 1. Fixed Gas Detection

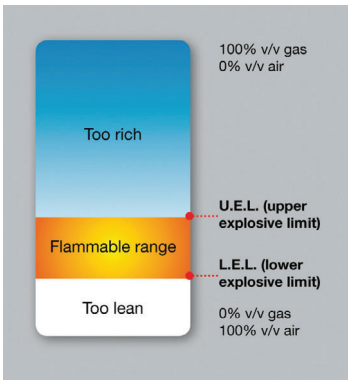
Industrial processes increasingly involve the use and manufacture of highly dangerous substances, particularly flammable, toxic and oxygen gases. Inevitably, gas occasionally escapes, which creates a potential hazard to the industrial plant, its employees and people living nearby.

### 2. Detection Principles

#### Flammable Gas Hazards

Combustion is a chemical reaction in which oxygen is combined rapidly with another substance resulting in the release of energy.

There is only a limited band of gas/air concentration which will produce a combustible mixture. This band is specific for each gas and vapor and is bounded by an upper level, known as the Upper Explosive Limit (or the UEL) and a lower level, called the Lower Explosive Limit (LEL).




#### Toxic Gas Hazards

Toxic gases are poisonous and can be dangerous to life at very low concentrations. The measurements most often used for the concentration of toxic gases are parts per million (ppm) and parts per billion (ppb). For example 1 ppm would be equivalent to a room filled with a total of one million balls and one of those balls being red. The red ball would represent 1 ppm.

More people die from toxic gas exposure than from explosions caused by the ignition of flammable gas.

### 3. Applications

| Building Environment | Specific Area | Gases Present (Detected by XCD) |
|---|---|---|
| Bulk and Specialty Gas Applications | • Metal Production<br>• Petroleum, Chemicals and Pharmaceuticals<br>• Energy, Oil and Gas<br>• Food and Beverage | • Carbon Dioxide<br>• Hydrogen<br>• Hydrogen Sulfide<br>• Oxygen |
| Light Industrial | • Specialty Chemicals Industry<br>• Printing Industry<br>• Plastic and Fibers Industry<br>• Agricultural Industry | • Carbon Dioxide<br>• Hydrogen<br>• Oxygen<br>• Flammables |

| Building Environment | Specific Area | Gases Present (Detected by XCD) |
|---|---|---|
| Waste Water Treatment Plants | • Digesters<br>• Plants Sumps<br>• $H_2S$ Scrubbers<br>• Carbon Monoxide Storage Rooms | • Carbon Monoxide<br>• Hydrogen Sulfide<br>• Methane<br>• Nitrogen Dioxide<br>• Chlorine<br>• Oxygen |
| General Manufacturing | • Battery Rooms<br>• Loading Docks<br>• Process Areas<br>• Machinery Rooms | • Carbon Monoxide<br>• Methane<br>• Oxygen<br>• Propane |