

MACURCO

GAS DETECTION



RESTAURANT / BEVERAGE GUIDE

This publication is intended to serve as a guideline for the use of the Macurco products. It is not to be considered all-inclusive, nor is it intended to replace the policy and procedures for any facility. If there are any doubts about the applicability of the equipment to your situation, consult an industrial hygienist or call Macurco Technical Service at 1-877-367-7891.



The logo for Macurco Gas Detection is centered at the top. The word "MACURCO" is in a large, bold, blue sans-serif font, with the "M" and "C" being significantly larger than the other letters. Below it, "GAS DETECTION" is written in a smaller, grey, sans-serif font. The background of the top half of the page is a blurred image of laboratory glassware, including several Erlenmeyer flasks and beakers. A diagonal purple band cuts across the page from the top right to the bottom left, separating the header from the table of contents. The bottom half of the page features a blurred image of a kitchen stove with a stainless steel pot on a lit burner. The bottom of the page is a solid purple band.

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APPLICATION OVERVIEW

Fast Food, Fast Casual, Dine-in, Bars, Breweries, Wineries



There are three main gas safety concerns within commercial kitchens throughout restaurants, fast food establishments, and bars. The first concern is a **Natural Gas or Propane** leak occurring and going undetected. In the event of a gas leak, a build-up can occur, increasing the risk of an explosion and potentially posing significant damage and loss of life. In a restaurant setting with fuel-based appliances, a high potential risk is leaving a burner engaged without the pilot light burning the gas, causing the gas to leak and go undetected. Another concern occurs when natural gas does not combust efficiently, and Carbon Monoxide is produced and not appropriately vented. **Carbon Monoxide** is a colorless, odorless toxic gas that will go undetected without a proper gas detector. The third gas of concern is Carbon Dioxide stored in gas tanks used for carbonating beverages such as soda and beer, and the tanks leaking or improper connection. **Carbon Dioxide** is a colorless and odorless toxic and asphyxiant gas that goes undetected without a proper gas detector.

Macurco recommends the Macurco Building & Home commercial series product line as a cost-effective solution to detect the appropriate gases that pose a potential hazard in the event of a gas leak.

TYPES OF GASES FOUND

COMBUSTIBLE GASES

TOO RICH FOR COMBUSTION

COMBUSTIBLE MIXTURE

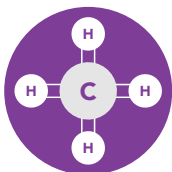
TOO LEAN FOR COMBUSTION

100% by Volume

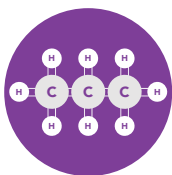
UEL

LEL

0% by Volume

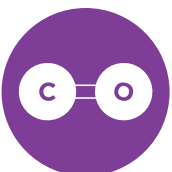


METHANE (CH₄) – Methane is a single-carbon alkaline and the main constituent of natural gas (roughly 95%) and is used as a common fuel source in many types of applications.



PROPANE (C₃H₈) – Propane is a three-carbon alkaline produced as a by-product of two other processes, natural gas processing and petroleum refining. It is used as a fuel source for domestic, industrial, and transportation applications.

CARBON MONOXIDE



CARBON MONOXIDE (CO) – Carbon Monoxide is often referred to as the “silent killer” because you cannot see or smell it so it can sneak up on you; therefore, a monitor is instrumental in the detection of CO. Symptoms of Carbon Monoxide poisoning include headaches, dizziness and vomiting which can often be mistaken for other flu-like illnesses. Carbon Monoxide (CO) is a poisonous gas responsible for hundreds of deaths and numerous non-fatal poisonings each year in the United States.

CO Level in Air	Health Effects and Symptoms
0 ppm	Fresh outdoor air.
100 ppm	Slight Headache after 1-2 hours.
200 ppm	Dizziness, headache, nausea after 2-3 hours.
400 ppm	Dizziness, headache, nausea after 1-2 hours / life threatening after 3 hours.
800 ppm	Dizziness, headache, nausea after 45 minutes, unconscious after 1 hour, death within 3 hours.
1,600 ppm	Dizziness, headache, nausea after 20 minutes, death within 2 hours.
3,200 ppm	Dizziness, headache, nausea after 10 minutes, death within 60 minutes.
6,400 ppm	Dizziness, headache, nausea after 1-2 minutes, death within 30 minutes.
12,800 ppm	Instantaneous effect, death within 3 minutes.

CARBON DIOXIDE



CARBON DIOXIDE (CO₂)

– Carbon Dioxide is produced by all aerobic organisms through the respiratory process. It is a versatile industrial material used in many different processes and products.

CO₂ is both an asphyxiant and a toxic gas.

CO ₂ PPM (% by volume)	Health Effects and Symptoms
350-450PPM (.035-.045%)	Fresh outdoor air.
400-1,000PPM (.04-.1%)	Indoor occupied spaces with good air exchange.
1,000-2,000PPM (.1-.2%)	Complaints of drowsiness and poor air.
2,000-5,000PPM (.5-.5%) Permissible Exposure Limit (PEL): 5,000 avg./8 hrs.	Headaches and sleepiness; stagnant, stale, and stuffy air. Poor concentration, loss of attention, increased heart rate, and slight nausea may be present.
>5,000PPM (.5%) avg./8 Hrs.	This indicates unusual air conditions where high levels of other gases also could be present. Toxicity or oxygen deprivation could occur. This is the permissible exposure limit (PEL) for daily workplace exposures.
30,000PPM (3%) Short Term Exposure Limit (STEL): 15 min.	Moderate respiratory stimulation, increased heart rate, and blood pressure.
>40,000PPM (4%) Immediately Dangerous to Life or Health (IDLH)	Exposure may lead to serious oxygen deprivation resulting in permanent brain damage, coma, or death.
50,000PPM (5%)	Strong respiratory stimulation, dizziness, confusion, headache, and shortness of breath.
80,000PPM (8%)	Dimmed sight, sweating, tremor, unconsciousness, and possible death.

EQUIPMENT SELECTION & LOCATION



MACURCO GD-6 (24V) GD-12 (120V) FOR COMBUSTIBLE GAS

- Coverage Area up to 1,257 sq. ft
(Centrally mounted, the radius is 15-20ft)
- Recommended mounting height (target gas-dependent):
 - Natural Gas (Methane) roughly 12" below the ceiling
 - Propane roughly 12" above the floor
- Centrally mounted where air movement is generally good
- Do not mount in a corner
- Do not mount where normal ambient temperature is below -4°F or exceeds 122°F (-20°C to 50°C)
- White or gray housing options



MACURCO CM-6 (24V) CM-12 (120V) FOR CARBON MONOXIDE

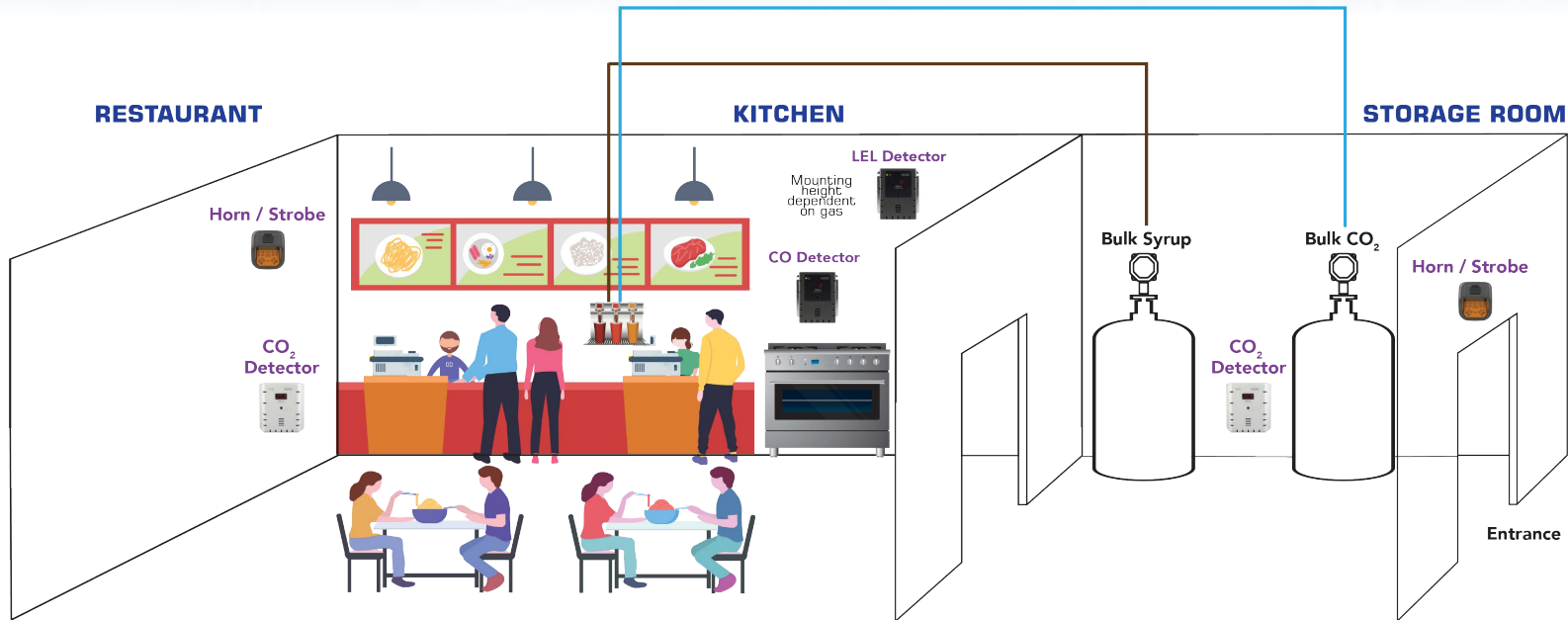
- Coverage Area up to 7,500 sq. ft
(Centrally mounted, the radius is 48.86ft)
- Recommended mounting height 4-6 ft. above the floor
- Centrally mounted where air movement is generally good
- Do not mount in a corner
- Do not mount where normal ambient temperature is below -4°F or exceeds 122°F (-20°C to 50°C)
- White or gray housing options



MACURCO CD-6B (24V) FOR CARBON DIOXIDE

- Coverage Area up to 5,000 sq. ft
(Centrally mounted, the radius is 39.89ft)
- Recommended mounting height 12-18" from the floor
- Centrally mounted where air movement is generally good
- Do not mount in a corner
- Do not mount where normal ambient temperature is below 32°F or exceeds 122°F (0°C to 50°C)

EQUIPMENT LAYOUT RECOMMENDATIONS



COMBUSTIBLE GASES (LEL)

Appliances in kitchens, such as grills, stoves, and fryers, often use natural gas or propane for their heating source. Leaks of these gases can lead to explosions. Using the **Macurco GD-6 or GD-12 (LEL Detector)** allows one to shut off valves and/or turn on ventilation equipment.

CARBON MONOXIDE (CO)

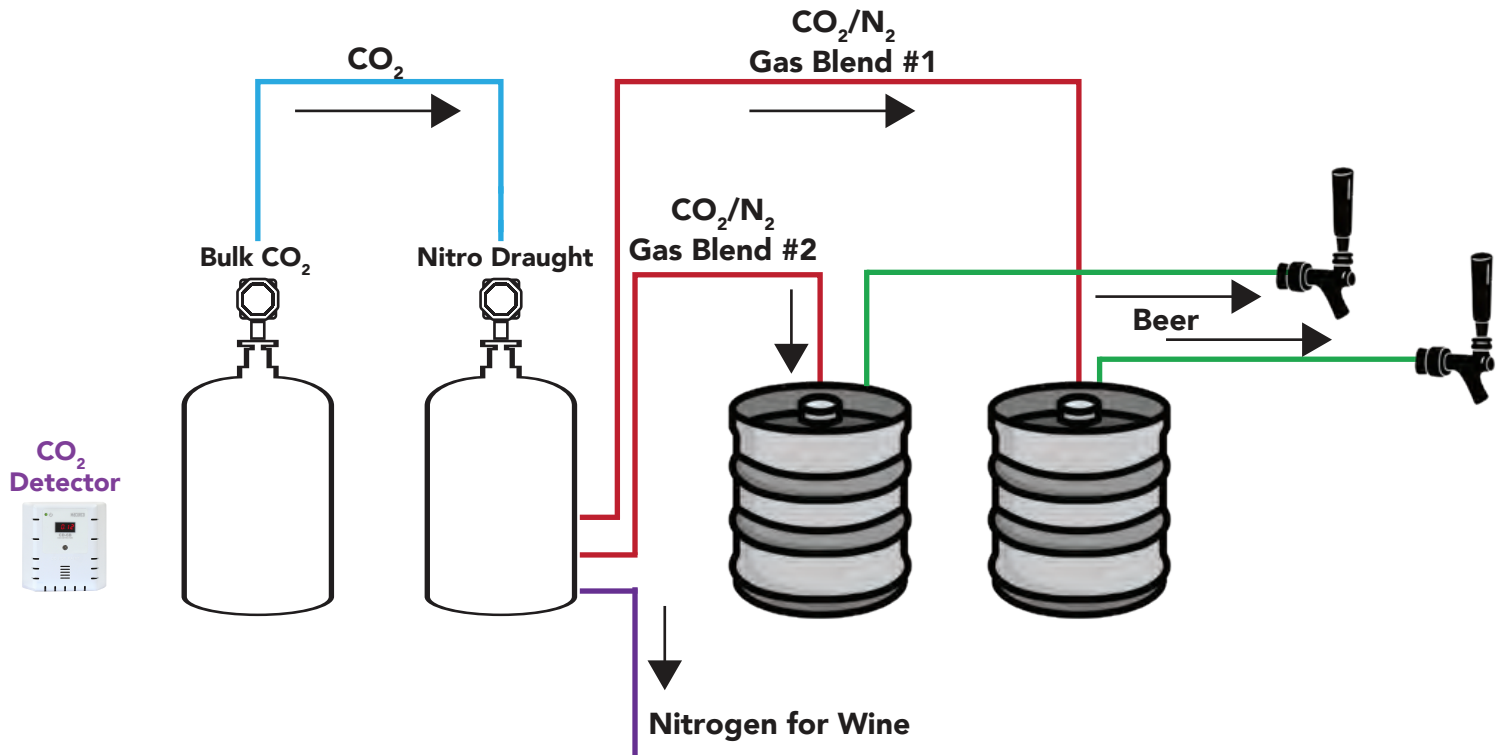
Carbon Monoxide is a by-product of the incomplete combustion of these fuel-type gases. Using the **Macurco CM-6 or CM-12 (Carbon Monoxide Detector)** allows one to shut off valves and/or turn on ventilation equipment.

CARBON DIOXIDE (CO₂)

Legislation dictates any storage of a Carbon Dioxide tank exceeding 100lbs for beverage dispensing must result in a Carbon Dioxide monitor present. There are two versions of this code which is based on what year of IFC the State has adopted. Using the **Macurco CD-6B or CD-6MC (Carbon Dioxide Detector)** allows one to be notified of a leak or unsafe levels of CO₂.

EXAMPLE LAYOUT

HOW IT WORKS



MAINTENANCE

DEMONSTRATION AND TRAINING

Inspect the components, equipment installation, and electrical connections for compliance with requirements. Test the alarm setpoints of the gas detection system with calibration / test gas and verify the sequence of operation. Perform demonstrations and train maintenance personnel to adjust, operate, troubleshoot, calibrate, and maintain the gas detection and control systems. **Calibration and test kits should be provided with the gas detection system.** Calibration and test intervals must comply with the manufacturer's recommendations. If required, prepare a written report to record test procedures, results, and corrective actions. The information should also cover the requirements for accessories like the acceptability of alarm types, signs, and protective equipment. **Macurco should perform any repair or replacement of malfunctioning units.**

MACURCO

GAS DETECTION

Celebrating over 50 years of gas detection, the Macurco product line offers equipment for residential, commercial, and industrial applications. Since 1972 Macurco has been providing detection options for several different gases, including Carbon Monoxide (CO), Nitrogen Dioxide (NO₂), Hydrogen (H₂), Propane (LP), Methane (natural gas), Hydrogen Sulfide (H₂S), Ammonia (NH₃), Oxygen (O₂), Carbon Dioxide (CO₂), and Refrigerants.

Macurco Inc. manufactures fixed, portable, and wireless gas detection equipment in Sioux Falls, South Dakota. Macurco strives to provide customers with the highest quality detection, safety, and security solutions worldwide. Whether you are looking for gas detection for a security system, building automation or HVAC system, personal protection, or for monitoring specific gases in potentially hazardous environments, Macurco has a gas detector to meet your needs.



GAS DETECTION IS ALL WE DO, AND WE DO IT BEST.

Visit www.macurco.com for additional product information and training.



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