

Carbon Monoxide Alarm



Turn to the Experts.™



Benefits of the Carrier Carbon Monoxide Alarm

INTRODUCTION

A very serious and often ignored issue in the home is the possible presence of carbon monoxide (CO) gas. Carbon monoxide is a potential cause for many everyday health problems, such as chronic headaches, muscle pains, and fatigue. Despite this fact, often little is done to protect family members from potential CO poisoning.

This dangerous gas is created by the imperfect combustion of fuel. Because many appliances use fuel for their operation, possible sources of CO exist throughout the home. If left unattended, these sources of CO can sometimes produce enough gas to cause several health problems and, at high levels, can even cause death.

There are specific steps that can be taken to help protect the occupants from CO poisoning. Eliminating the source of the gas is the most important step, but early detection of the gas is also key to preventing serious injury. Early detection of dangerous levels of CO can help prevent serious health issues before they occur.

This guide will discuss carbon monoxide production and the problems it creates, possible solutions to these problems, and the benefits of using Carrier's Carbon Monoxide Alarm.

WHAT IS CARBON MONOXIDE?

Carbon monoxide is a colorless, odorless, tasteless gas that is created by the imperfect combustion of fossil fuels. Carbon monoxide (CO) is found in typically low levels anywhere a fuel source is burning, including in the home. However, if CO is allowed to build to a high level, it can cause asphyxiation in humans and animals. For this reason, CO should be considered a deadly gas.²

COMBUSTION OF FOSSIL FUELS

To burn properly, fossil fuels need a specific amount of oxygen and a certain flame temperature. If the ideal amount of oxygen and fuel is supplied and the flame temperature remains high enough, all the fuel ignites and results in perfect combustion. Perfect combustion produces very few byproducts – typically only heat, carbon dioxide (CO₂), hydrogen, oxygen and water vapor. Under typical conditions, this perfect combustion does not occur, and combustion can be described as either good or incomplete. Under good combustion, which is not hazardous to home occupants, fuel combusts and produces heat, oxygen, carbon dioxide, nitrogen, and water vapor. Under incomplete combustion, which can be hazardous to home occupants, these byproducts are created in addition to carbon monoxide. Incomplete combustion occurs when the flame temperature drops below 1128° F, and is often the result of an improper mixture of oxygen and fuel.¹ (See FIG. 1)

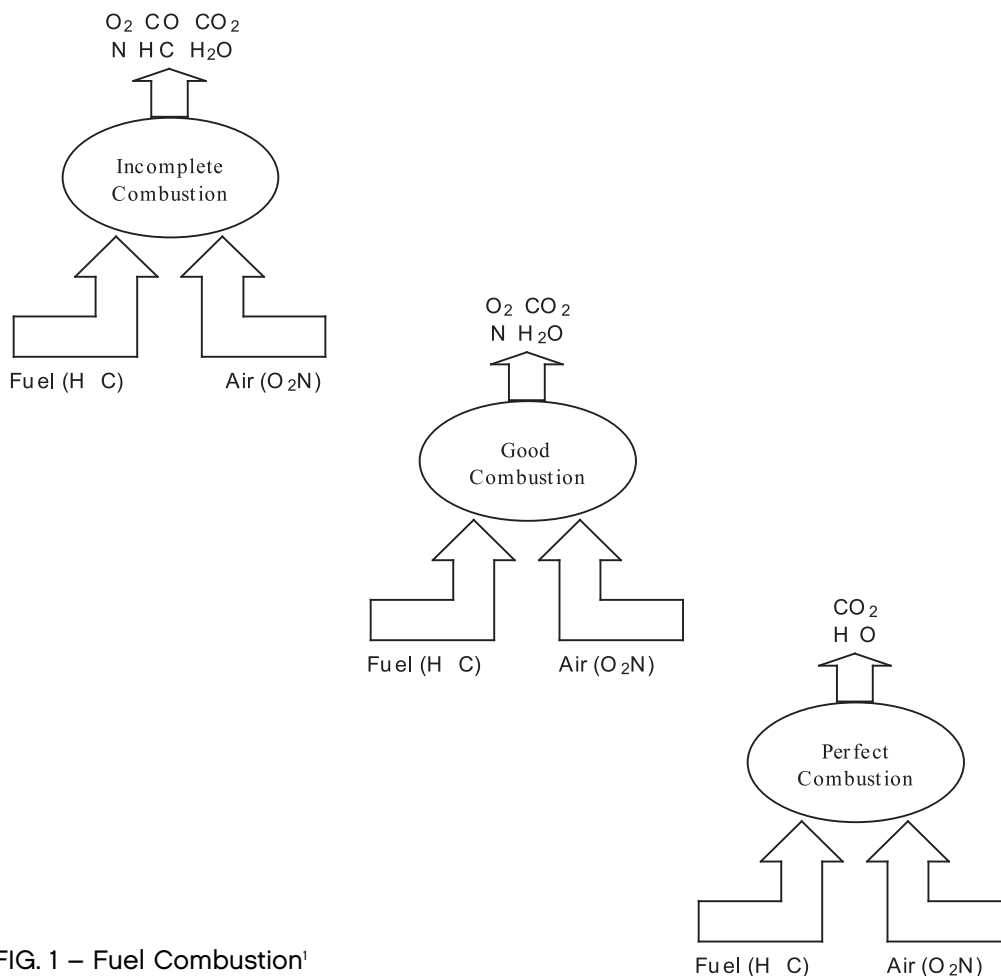


FIG. 1 – Fuel Combustion¹

EFFECTS OF CARBON MONOXIDE ON THE HUMAN BODY

Carbon monoxide is breathed into the lungs where it eventually enters the blood stream. Red blood cells in the blood stream contain hemoglobin, which normally collects oxygen and carries it to all parts of the body. However, when CO is inhaled, it bonds with the hemoglobin and creates carboxyhemoglobin. Carboxyhemoglobin blocks the absorption of oxygen by the red blood cells. The result is that the body is starved of oxygen and begins to suffocate from the inside. If enough CO is inhaled, the results can be fatal.

Carbon monoxide poisoning can be very fast acting if the level of CO is high enough. The following chart outlines the lethal time frame associated with different levels of CO.

50 ppm	Max level allowed by OSHA for an 8-hour period
200 ppm	Slight headache, fatigue, and dizziness
400 ppm	Life threatening after 3 hours
800 ppm	Fatal within 2-3 hours
1,600 ppm	Fatal within 1 hour
3,200 ppm	Fatal within 30 minutes
6,400 ppm	Fatal within 15 minutes
12,800 ppm	Fatal within 1-3 minutes

FIG. 2 – Lethal CO Levels

Carbon monoxide can also have health consequences at lower levels. Symptoms vary from person to person, depending on age, overall health, and the concentration and length of exposure. Some of the common symptoms include headaches, dizziness, disorientation, nausea, and fatigue.² Often these symptoms are misinterpreted as the flu or some other common illness. Another concern is for the health of household pets. Because of their smaller size and generally higher metabolism, house pets may be more obviously and severely affected by CO intoxication.¹ Once again, due to CO's colorless, odorless, tasteless nature, it is impossible to detect its presence or know that it is the cause of these health problems without a CO alarm.

PROTECTING THE HOME FROM CARBON MONOXIDE

Every year, over 2,000 people in the United States die from CO poisoning. According to the United States Environmental Protection Agency, the most important way to protect the home from carbon monoxide poisoning is to be sure that combustion equipment is properly maintained and properly adjusted. The EPA suggests the following steps to ensure reduced levels in the home²:

- Keep gas appliances properly adjusted
- Consider purchasing a vented space heater when replacing an unvented one
- Use proper fuel in kerosene space heaters
- Install and use an exhaust fan vented to outdoors over gas ovens
- Open flues when fireplaces are in use
- Choose properly sized wood stoves that are certified to meet EPA emission standards – Make certain that doors on all wood stoves fit tightly
- Have a trained professional inspect, clean, and tune-up central heating system (furnaces, flues, and chimneys) annually – Repair any leaks promptly
- Do not idle the car inside the garage

CO levels are typically measured in parts per million (ppm). The average CO level for a typical home without gas stoves ranges from 0.5 to 5 ppm. Homes with properly adjusted gas stoves should be in the range of 5 to 15 ppm.²

CARBON MONOXIDE ALARMS

Proper maintenance of fuel burning appliances is very important. However, maintenance alone may not be enough to protect the home from dangerous levels of CO. Often, servicing is not comprehensive and fails to identify real problems, especially in the flue.¹ Dangerous levels of CO may remain in the home undetected. One easy method for detecting the gas is with a carbon monoxide alarm.

The Consumer Product Safety Commission, a government agency committed to protecting consumers and families from products that pose a fire, electrical, chemical, or mechanical hazard, recommends that CO detectors be installed in every home. The trend apparently is catching on. A number of states and cities now require them.³

The typical carbon monoxide alarm is AC or battery powered. Most will alert the homeowner by way of an audible alarm when levels of CO rise above 70 ppm for a duration of one hour, or sooner if higher levels are detected. They are relatively inexpensive and have a life span of five years. These affordable, easy to use devices are the best way to detect dangerous levels of carbon monoxide in the home.

BENEFITS OF THE CARRIER CARBON MONOXIDE ALARM

When a home is equipped with a Carrier Carbon Monoxide Alarm, the indoor air passes through the unit where dangerous levels of carbon monoxide can be detected using sophisticated electronic components and unmatched sensor technology.

- **Loud audible alarm**
Quickly alerts the homeowner of dangerous levels of carbon monoxide.
- **Continuous digital display**
Allows for instant information about the current level of carbon monoxide in the home.
- **Peak level button showing the latest peak CO level**
Allows a health professional to quickly assess the level of exposure in the event of an alarm.
- **Test/Reset button functions**
Homeowner can easily insure the unit is functioning properly with the push of a single button.
- **Rechargeable Lithium ion battery**
Protects occupants during power outages and never needs replacement – Carrier exclusive.
- **Seven-year warranty**
Carrier Control Exclusive

CARRIER CARBON MONOXIDE ALARM PLACEMENT

Carrier recommends placing the initial CO Alarm near main sleeping areas where it can awaken sleeping occupants if the alarm sounds, with additional units installed on each floor. The following diagram shows the typical placement of CO alarms.

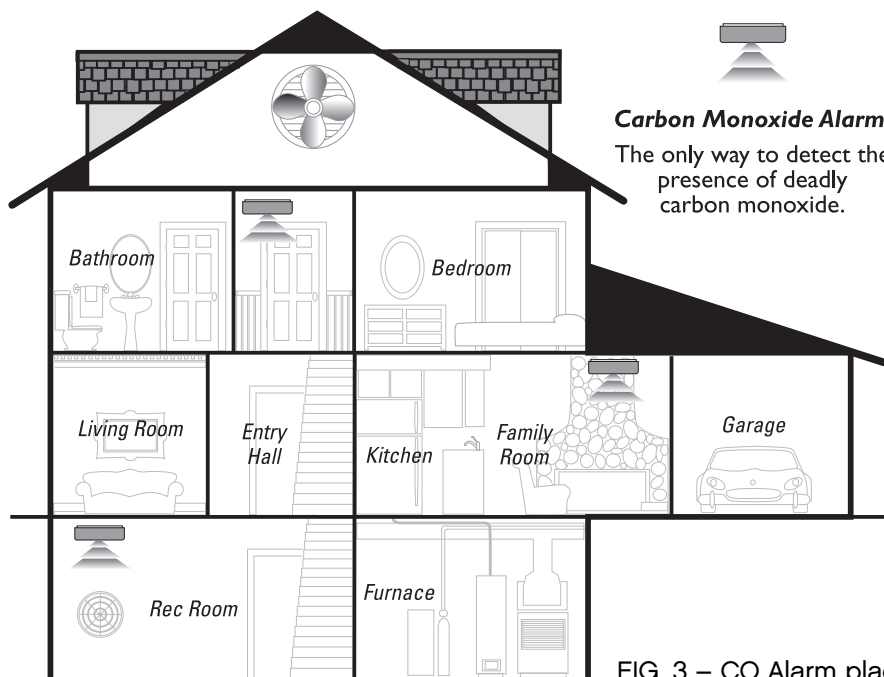


FIG. 3 – CO Alarm placement

COMMON SOURCES OF CARBON MONOXIDE

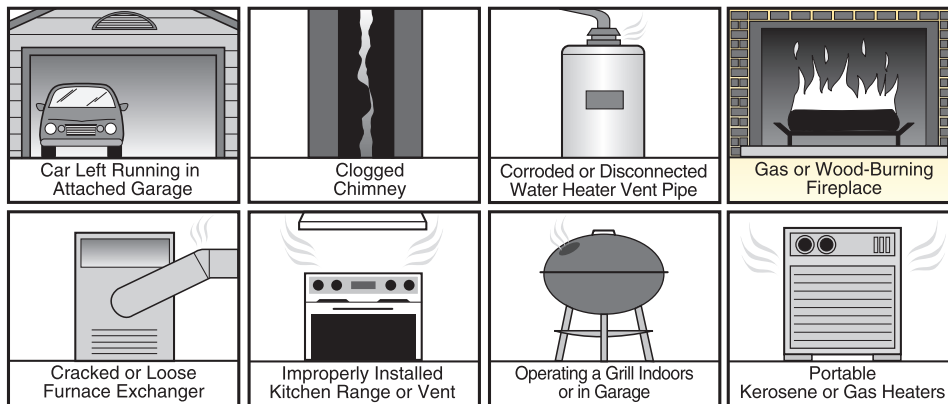


FIG. 4 – Common sources of CO

MAINTENANCE

The Carrier Carbon Monoxide Alarm should be checked weekly using the push button test, and inspected annually. The unit has a seven-year limited warranty.

SOURCES

- 1: Dwyer et al. *Carbon Monoxide: A Clear and Present Danger*. 3rd ed. Mount Prospect: ESCO Press, 2003.
- 2: United States. Environmental Protection Agency. *Sources of Indoor Air Pollution – Carbon Monoxide (CO)*. <http://www.epa.gov/iaq/co.html>. October 2005.
- 3: United States. Consumer Product Safety Commission. *Carbon Monoxide Questions and Answers*. CPSC Document #466.



www.carrier.com

A member of the United Technologies Corporation family.
Stock Symbol UTX.



© Carrier Corporation 2006

01-811-20105-10

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice or without incurring obligations.