Gas Information Sheet No. 36

Carbon Monoxide Alarms for Domestic Use

Introduction

ESV does not endorse the installation of carbon monoxide (CO) alarms as a method of reducing the threat of CO poisoning in homes, but strongly promotes regular maintenance of gas heating appliances to reduce the possibility of CO poisoning.

This information sheet has been prepared for gasfitters and the community and provides information about electrochemical CO alarms, their conditions of use and reiterates the health implications of CO poisoning. Gas Information Sheet 36 is designed for information only.

The incomplete combustion of natural gas or LP gas in gas appliances can produce CO. It is highly poisonous, invisible, odourless and is very difficult to detect with the human senses, however, it is usually produced along with formaldehyde and other compounds that have a strong odour. The build up of CO in the blood interferes with the body's ability to supply itself with oxygen and is therefore dangerous to your health.

Under normal operating conditions, where gas appliances are well maintained and correctly ventilated, CO gas levels are minimal, although high levels of CO can occur if one or more of the following conditions exist:

- An appliance is faulty or is poorly maintained.
- A flue is partially or totally blocked.
- The heater is not adequately ventilated.

Electrochemical CO alarms

Electrochemical sensor CO alarms are the most common type available. They are highly sensitive in detecting CO in the home and offer accurate readings of CO levels. In this type of alarm a chemical reaction with CO gas creates an electrical current that sets off an alarm.

Alarms are designed to trigger at certain CO concentrations and time periods. Your CO alarm instruction sheet should provide triggering times and CO concentrations. These trigger points will vary between alarms.

The proximity of the alarm in relation to a gas appliance will also influence the triggering conditions. This is in part due to the nature of CO gas, which is marginally lighter than air; allowing air currents to affect the CO concentration in a room. A CO alarm too close to a gas heating appliance may set off nuisance alarms while a CO alarm too far from the gas heating appliance may be slow to react.

CO alarms detect CO gas from sources of combustion. They do not detect smoke, other gases or fire.

CO alarms will only indicate the presence of CO gas at the sensor. The concentration of CO in the room may vary in relation to the CO measured at the sensor.

Electrochemical alarms have a limited life span (around 2 to 7 years). However the life expectancy and the effectiveness of CO alarms will be subject to the environment they operate in. The level of exposure to CO along with heat, humidity and dust will affect the useful life of a CO alarm as will failing batteries.

> ***Some CO alarms provide a visual and audible warning when the electrochemical sensing cell has expired, while others may only provide a use-by date.***
>
> ***If you are intending to purchase CO alarms, consider alarms that provide visual and audible alarms indicating the electrochemical sensing cell has expired.***

These alarms are pre-calibrated and do not require maintenance other than to clean the outside case occasionally. Ensure the holes on the front of the unit are clear of dirt or dust.
Keep CO alarms in good working order:

- remove accumulated dust from the alarm
- do not use cleaning agents, detergents or solvents to clean the alarm
- do not spray aerosols nearby as these substances can affect the electrochemical sensor
- do not paint the CO alarm (paint will seal the vent holes and interfere with the sensor's ability to detect CO gas)
- do not allow children to play with the alarm

Performance of CO alarms

Be aware that CO alarm performance can be affected by:

- Excessive spillage or reverse flueing of gas appliances caused by
  - wind, including high gusts of wind
  - heavy air in the flue (i.e. cold/humid air)
  - negative pressure differential within the room, resulting from the use of exhaust fans
  - simultaneous operation of several gas appliances competing for limited internal air
- extended operation of un-flued gas appliances
- temperature inversions, which can trap exhaust gases near the ground
- other equipment that produces CO such as a car idling in a garage attached to the home.

Placement of CO alarms in homes

CO alarm manufacturers suggest installing CO alarms in or near to every room that has a gas heating appliance. When selecting installation locations, make sure the alarm is audible from all sleeping areas.

Alarms located in the same room as a gas heating appliance should be located as directed by the manufacturer's installation instructions. If there is a partition in a room, the unit should be located on the same side of the partition as the gas heating appliance.

Alarms should also be installed in or near bedrooms or other rooms remote from gas heating appliances, which are normally occupied, and should be located relatively close to the breathing area of the occupants.

Care of CO alarms

CO alarms are for indoor use only. Do not expose them to rain or moisture and do not knock or drop them. Opening or tampering with the alarm could cause it to malfunction.

Do not place CO alarms in the following areas:

- in close proximity to a gas cooking appliance as this may result in nuisance activation of the alarm
- where the air temperature is outside the range for which the alarm is designed as specified in the manufacturer's instructions
- where dirt or dust could collect and block the sensor
- where it could be easily knocked, damaged, or where it could be inadvertently removed
- in a damp area or directly above a sink
- in or below a cupboard
- behind curtains or furniture
- in dead air spaces such as peaks of vaulted ceilings, or gabled roofs
- next to a door or window or anywhere that would be affected by draughts
- in turbulent air from ceiling fans
- where the air flow would be obstructed by curtains or furniture
- in areas of high or low humidity (battery efficiency may be reduced)

Ensure that all vents on the alarm are unobstructed. CO gas must be able to reach the sensor for the alarm to accurately detect it.

Standards

There is no standard in Australia that covers the design, manufacture, installation or servicing of CO alarms for domestic premises. ESV suggests you choose a CO alarm certified to ***EN50291*** (European standard) or ***UL2034*** (US standard).

Purchasing CO alarms

Consideration prior to purchase should be given to CO alarms that have the following features:

- Visual indicators for:
  - the alarm
  - alarm fault
  - sensor end of life
  - electrical power
- Audible signals for:
  - the alarm
  - sensor end-of-life signal; an audible signal, differing from the alarm signal
- Markings:
  - showing manufacturer's name, supplier's name or trademark
  - identifying model number or name

- listing the standard to which it is certified, e.g. “EN50291” or “UL2034”
- mounting position if a unit is intended to be mounted in a definite position
- identifying serial number or manufacturing date
- showing supply voltage, frequency and power consumption or type and size of batteries
- indicating recommended maximum lifetime

Conclusion

The use of CO alarms may be an attractive option to reduce the threat of CO poisoning in homes, ***however***, issues related to the effectiveness, useful life, number required and positioning of CO alarms may lessen the desire to use them. Also CO alarms, for use in domestic premises, are not linked into the gas supply for the appliance and cannot affect a gas cut-off if a fault arises.

Given the technical difficulties in their application and when used in isolation to other controls, CO alarms are not likely to reduce the potential of CO poisoning. CO alarms may not protect people who are at special risk from CO exposure by reason of age, pregnancy or medical condition.

Audible CO alarms may be considered a useful back-up precaution, but they are no substitute for the proper installation and maintenance of gas heating appliances.

If you do install CO alarms you should regularly check that batteries are charged and check the expiry date marked on the alarm.

Furthermore you should ensure that your gas heating appliances are serviced at least every two years.