



Carbon monoxide

General information

Key Points

Fire

- Flammable gas
- May react violently with other substances
- Use fine water spray with normal fire-fighting clothing and breathing apparatus

Health

- Toxic when inhaled
- Following short-term exposure symptoms such as headache, dizziness, confusion, disorientation, memory loss, fainting, coma and death may arise
- Effects such as fast heart rate and breathing, low blood pressure and cardiac arrest may also occur
- Long-term effects may occur such as behavioural changes
- Long-term exposure to low concentrations of carbon monoxide may cause tiredness, headaches, sickness, dizziness, personality changes, memory problems, visual and hearing loss
- Carbon monoxide may cause harm to the unborn child

Environment

- Unlikely to pose a significant risk to the environment

Background

Carbon monoxide is a colourless, tasteless, odourless, non-irritating gas produced during incomplete combustion of gas or fossil fuels due to there being insufficient oxygen present.

In the home, incorrectly installed, poorly maintained and ventilated cooking and heating appliances, such as those using gas, coal, wood or paraffin are the main sources of carbon monoxide. As well as these domestic sources, the most significant exposure to carbon monoxide comes from cigarette smoking and car exhausts.



Production of carbon monoxide increases when cars are moving slowly hence levels of carbon monoxide in the atmosphere are higher near busy roads during peak times when the flow of traffic is slow. Carbon monoxide production increases when the engine is cold, as catalytic converters take time to reach the operating temperature and thus petrol engine cars in closed garages are dangerous even with a catalytic converter. Levels may also increase in winter due to periods of still cold air as this affects the dispersal of carbon monoxide, as it is usually rapidly dispersed away from roads and destroyed by photochemical reactions over a period of months.



In smokers, cigarettes are the major source of carbon monoxide. The amount of carbon monoxide in the blood of smokers is greater than that caused from breathing in contaminated air, even in polluted areas.



When breathed in, carbon monoxide enters the blood through the lungs and attaches to the body's oxygen carrier, haemoglobin. This reduces the amount of oxygen that can be carried round the body. Carbon monoxide also impairs the release of such oxygen as it is transported. Exposure to higher concentrations for a short period of time can cause headaches, dizziness, nausea, vomiting, confusion, collapse and coma. When individuals are removed from the source of carbon monoxide these symptoms usually subside. Exposure to lower concentrations of carbon monoxide for a longer period may affect learning, manual dexterity, driving performance and attention level.

People who have diseases that affect the delivery of oxygen to the heart or brain, such as those with coronary heart disease, angina or anaemia are particularly at risk from carbon monoxide poisoning as the amount of oxygen being carried to the heart or brain is further reduced by carbon monoxide.

Carbon monoxide is transported across the placenta which reduces the oxygen supply to the baby. Therefore exposure to elevated levels of carbon monoxide during pregnancy may result in a decrease in birth weight and possibly behavioural problems. Such effects are more likely in smokers because smoking is a significant source of carbon monoxide.

Production and Uses

Key Points

- Carbon monoxide is produced by both natural and anthropogenic sources
- Carbon monoxide is predominantly formed during incomplete combustion of organic materials
- The largest source of carbon monoxide is from motor vehicle exhausts and cigarette smoking

Carbon monoxide is produced by both natural and anthropogenic sources, accounting for 40 and 60 %, respectively. It is predominantly formed during incomplete combustion of organic materials. Complete combustion occurs when sufficient oxygen is present and leads to the production of carbon dioxide. In situations where there is a deficiency of oxygen, carbon monoxide is formed. Most combustion processes produce some carbon monoxide.

The largest anthropogenic source of carbon monoxide is from exhausts of motor engines, which accounts for approximately 69 % of UK emissions. Industrial processes such as power plants using coal and waste incinerators also contribute to environmental carbon monoxide emissions. In indoor environments, oil, gas or kerosene heaters and faulty gas appliances produce significant amounts of carbon monoxide.

Frequently Asked Questions

What is carbon monoxide?

Carbon monoxide is a colourless, tasteless, odourless gas. Exposure to high levels can kill.

How will I be exposed to carbon monoxide?

Carbon monoxide is produced when fossil fuels burn without enough air. Indoors, one of the main sources of exposure to carbon monoxide is from faulty, incorrectly installed, poorly maintained, or poorly ventilated cooking or heating appliances which use fossil fuels. Cigarette smoke is also a major source of exposure. Exposure to low levels of carbon monoxide can occur outdoors, as it is also produced by vehicle exhausts.

How will I know that I have been exposed to carbon monoxide? What does it taste/smell/look like?

Carbon monoxide is colourless, tasteless and odourless, so you will not necessarily know that you have been exposed to it.

What are the health effects of carbon monoxide?

At high concentrations, carbon monoxide can kill. People who are exposed to carbon monoxide may experience headaches, dizziness, nausea (feeling sick) and tiredness. High concentrations can cause people to become confused, they may collapse and become unconscious. When individuals are removed from the source of carbon monoxide these symptoms usually improve. Exposure to lower concentrations of carbon monoxide for a longer period may affect young people's school work and an adult's ability to concentrate and think clearly.

Are children more at risk from carbon monoxide than adults?

Children may suffer health effects in a shorter period of time than an adult breathing in the same concentration of CO.

Can carbon monoxide harm unborn children and can it lead to child development problems?

If a pregnant woman is exposed to carbon monoxide, the birth weight of her baby may be decreased, and it is possible that the child may develop behavioural problems. Effects may occur at lower levels in smokers who continue to smoke during pregnancy. Cigarette smoke is a major source of exposure to carbon monoxide and is known to cause a decrease in birth weight.

Can carbon monoxide cause cancer?

It is not thought that carbon monoxide can cause cancer.

What symptoms should I look for if I think I have been exposed to carbon monoxide?

Headaches, tiredness, difficulty in thinking clearly and feeling sick are common symptoms of carbon monoxide poisoning. Symptoms of carbon monoxide poisoning can also be similar to those for food poisoning and flu.

What should I do if I think I am being exposed to carbon monoxide?

Stop using all your cooking and heating appliances. You should move away from the source of exposure (for example a faulty domestic appliance) to a well-ventilated area. Open your windows and move outside. **If you think you have been exposed to carbon monoxide and feel unwell or are worried call NHS Direct on 0845 46 47, or in an emergency call 999.** When people are removed from the source of carbon monoxide exposure, their health usually improves and their symptoms subside, but it is still important to seek medical advice. You should call a suitably qualified and registered engineer to check all your cooking and heating appliances before returning home.

What can I do to protect myself from carbon monoxide?

Have all cooking and heating appliances which use fossil fuels (such as gas, oil and coal) serviced regularly by a qualified and registered engineer, for example Gas Safe Register (for gas appliances), HETAS (for solid fuel appliances) and OFTEC (for oil appliances). It is important to make sure that you have adequate ventilation when using these appliances, therefore chimneys and flues should be kept clean by being swept from top to bottom at least once a year by a qualified sweep and should not be blocked. Fitting an audible carbon monoxide alarm that meets British or European Standards (BS Kitemark or EN 50291) will help to protect you from exposure to high levels of carbon monoxide. The alarm will not go off if you are being exposed to lower levels of carbon monoxide so it should not be used as a substitute for regular servicing of appliances.