



Phosgene

General Information

Key Points

- phosgene is a colourless, with a smell of freshly cut grass or mouldy hay
- phosgene is an important industrial chemical, it is used to produce plastics, dyes, insecticides, herbicides and pharmaceutical chemicals
- some chlorine-solvents when exposed to heat or flame will release phosgene
- phosgene is very toxic, small exposures may result in eye, throat and chest irritation
- large exposure may cause build-up of fluid in the lungs that may be life-threatening
- phosgene gas may cause irritation of moist skin, splashes of liquefied phosgene may cause serious injury to the eye and cold burns to the skin
- anyone who has been exposed to phosgene should be taken to hospital for observation as symptoms can be delayed

Public Health Questions

What is phosgene?

Phosgene is a colourless, reactive, non-flammable gas that is heavier than air. It has a smell of cut grass or mouldy hay, although not everyone will be able to smell this. It is commonly stored under high pressure as a liquid.

What is phosgene used for?

Phosgene is important in producing various other chemicals, it is produced in large quantities in the EU (more than 10,000 tonnes a year). It is used in the production of plastics, dyes, insecticides, herbicides and pharmaceutical chemicals.

Phosgene was used as a 'war gas' during World War I. Since then, its use as a chemical warfare agent has been forbidden by an international treaty known as the Chemical Weapons Convention. For this reason, the production and storage of phosgene is subject to special regulations.

How does phosgene get into the environment?

When exposed to flame or intense heat, some chemicals (chlorinated hydrocarbons, such as paint stripper, also trichloroethylene and tetrachloroethane) may release smoke and fumes containing phosgene. Contact of chlorinated solvents with hot metal surfaces may liberate significant quantities of phosgene, e.g. during the welding of metal that has been prepared by cleaning with chlorinated solvents. Organochlorine pollutants such as chloroform and tetrachloroethylene, and polymers such as polyvinyl chloride, may decompose in the atmosphere to form phosgene each year.

Phosgene may be released from industrial sites or transport vehicles (so-called 'fugitive emissions'). Phosgene can also be present in smoke from fires which are fuelled by certain types of plastic or chlorine-containing solvents.

How might I be exposed to phosgene?

Phosgene is not used domestically and so exposure in the home is unlikely. However, phosgene can be produced accidentally if solvents containing chlorine are exposed to hot metal surfaces, flames or intense heat.

Work-places are subject to legal restrictions on the allowable concentration of phosgene in the air. These 'exposure limits' are set well below those which are thought to cause health effects following daily exposure to phosgene.

If I am exposed to phosgene how might it affect my health?

The presence of phosgene in the environment does not always lead to exposure. In order for it to cause any adverse health effects you must come into contact with it. You may be

exposed by breathing phosgene or by skin contact with it. Following exposure to any chemical, the adverse health effects you may encounter depend on several factors, including the amount to which you are exposed (dose), the way you are exposed, the duration of exposure, the form of the chemical and if you were exposed to any other chemicals.

Phosgene is very toxic. Exposure to low levels may result in brief eye, throat and chest irritation; low level exposure is unlikely to result in long term health effects. With higher exposures there may be a symptom-free period of 1 hour to one day, after which signs of lung damage (coughing, chest pain and breathlessness) may occur. Exposure to high concentrations may also lead to a serious condition called pulmonary oedema, where fluid enters the lung and limits the body's ability to absorb oxygen from the air. As the serious effects of phosgene exposure are delayed and may occur without immediate signs or symptoms, anyone who has been exposed to phosgene should be taken to hospital for observation. Recovery following exposure to high concentrations of phosgene may take many months for some people.

Phosgene gas may cause irritation of moist skin. Splashes of liquefied phosgene may cause serious injury to the eye and cold burns to the skin.

Can phosgene cause cancer?

Phosgene is not thought to be a cancer causing chemical.

Does phosgene affect pregnancy or the unborn child?

There are no appropriate studies evaluating the potential effects of phosgene on pregnancy.

How might phosgene affect children?

There is little information on the effects of phosgene on children. It is likely that children exposed to phosgene would experience similar symptoms to those seen in exposed adults.

Are certain groups more vulnerable to the harmful effects of phosgene?

Smokers and people with existing lung diseases may experience more severe and persistent lung injury following exposure to phosgene.

What should I do if I am exposed to phosgene?

It is very unlikely that the general population will be exposed to a level of phosgene high enough to cause adverse health effects. However, if you have any health concerns regarding exposure to phosgene seek guidance from your GP or contact NHS 111

Additional sources of information

NHS Choices - Poisoning <http://www.nhs.uk/Conditions/Poisoning/Pages/Introduction.aspx>

UKTIS. Best Use of Medicines in Pregnancy <http://www.medicinesinpregnancy.org/>

This information contained in this document from the PHE Centre for Radiation, Chemical and Environmental Hazards is correct at the time of its publication.

First published: October 2016

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