



CS Gas (2-chlorobenzylidene malononitrole)

General Information

Key Points

- 2-chlorobenzylidene malononitrole or “CS” is a white crystalline solid when pure
- it is used by UK police forces as a temporary incapacitant spray
- when released, CS gas will disperse into the atmosphere in a matter of minutes
- exposure to CS gas may cause intense tear production, eye pain, chest tightness, coughing and sneezing
- skin contact will lead to burning and stinging with possible redness and blistering
- treatment is rarely needed because people usually recover within 15-20 minutes
- physical injury to the eyes may occur if CS gas is sprayed directly into them at a very close range

Public Health Questions

What is CS gas and what is it used for?

2-chlorobenzylidene malononitrole or “CS” is a white crystalline solid when pure. The substance causes irritation in humans and is used by UK police forces as a temporary incapacitant spray to subdue persons who pose a risk to themselves and/or the police officers and others in the vicinity. It may be dispersed in a smoke cloud or dissolved into liquid (e.g. the solvent methyl iso-butyl ketone) to be used as a spray. The CS spray carried by some UK police forces contains 5% 2-chlorobenzylidene malononitrole. It is also used by the military in training operations and for testing gas masks.

These substances may be referred to as CS or tear spray/gas (not to be confused with PAVA spray which is also referred to as tear spray/gas). In this document the use of the term “CS gas” is used to refer to any gasses or sprays containing 2-chlorobenzylidene malononitrole.

How does CS gas get into the environment?

CS gas may be released during its use, or following an accident during storage, transport or disposal. When released, CS gas will disperse into the atmosphere in a matter of minutes.

How might I be exposed to CS gas?

CS gas is released into the air via an aerosol spray or in smoke, exposure may occur by skin or eye contact or by breathing in the gas.

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

The presence of CS gas 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 to CS gas by breathing it or by skin and eye 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.

Exposure to CS gas may cause intense tear production, eye pain, chest tightness, coughing and sneezing. If ingested, a stinging or burning sensation in the mouth with increased salivation and vomiting may occur. Contact with the skin will lead to burning and stinging with possible redness and blistering. Treatment is rarely needed because people usually recover quickly (within 15-30 minutes) after a brief exposure.

Exposure to large amounts of CS gas (such as that following release of CS gas in a confined space) for a long time may result in lung damage. Physical injury to the eyes may occur if CS gas is sprayed directly into them at a very close range.

Can CS gas cause cancer?

CS gas is not thought to cause cancer in humans.

Does CS gas affect pregnancy or the unborn child?

The limited available data suggests that exposure to CS gas following its use by police forces is not associated with harm to the unborn child.

How might CS gas affect children?

The effect of CS gas on children is likely to be the same as for adults.

Are certain groups more vulnerable to the harmful effects of CS gas?

People with existing diseases of the lungs or airways may be more sensitive to the effects of CS gas.

What should I do if I am exposed to CS gas?

Please see below for initial advice following exposure to CS gas:

You should remove yourself from any confined space. CS gas will disperse in fresh air in a few minutes. Complete recovery should be rapid (15-30 minutes). Do not rub your eyes as this may make symptoms worse. Do not wash the skin as using water immediately after exposure may make symptoms worse by spreading CS around the body.

Please see below for advice if symptoms persist for longer than 30 minutes:

If you have got CS gas on your skin, remove soiled clothing (not over the head), wash the affected area with lukewarm water and soap for at least 10 – 15 minutes and seek medical advice.

If you have got CS gas in your eyes, remove contact lenses, irrigate the affected eye with lukewarm water for at least 10 – 15 minutes and seek medical advice.

If you have inhaled CS gas and symptoms persist for longer than 30 minutes, seek medical advice.

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 document from the PHE Centre for Radiation, Chemical and Environmental Hazards reflects understanding and evaluation of the current scientific evidence as presented and referenced here.

First published: October 2018

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