Public Health England

Hydrogen Peroxide

General Information

Key Points

Fire

- Oxidising and flammable
- May explode from friction, heat or contamination producing oxygen which increases fire hazard. Reacts violently with combustibles, reducing agents, metals and organic materials such as wood or asbestos
- Rapidly decomposes to form water and oxygen
- In the event of a fire involving hydrogen peroxide, use fine water spray and liquid tight fire kit with breathing apparatus

Health

- Toxic via ingestion, inhalation, skin or eye contact
- Harmful and corrosive
- Ingestion may cause irritation of the gastrointestinal tract with vomiting which may contain blood, gastrointestinal bloating, tiredness and coma
- Inhalation of hydrogen peroxide may cause irritation of the nose, throat and respiratory tract. In severe cases an accumulation of fluid in the lungs may occur
- Skin contact can cause bleaching of skin, and at higher concentrations redness and swelling, blistering and burns
- Exposure to the eyes may result in pain, running of the eyes, conjunctivitis, and sensitivity to light

Environment

- Avoid release into the environment
- Inform Environment Agency of substantial incidents

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Background

Hydrogen peroxide is a colourless liquid with a slightly sharp odour, which is unstable and flammable under heating, friction or when contaminated.

Hydrogen peroxide occurs naturally at very low levels in the air and water, in human and plant tissues and bacteria and in some food and drinks.

Hydrogen peroxide is produced industrially in large quantities. The main use of hydrogen peroxide is as a bleaching agent for wood pulp, as well as for bleaching textiles, paper and food. It is also used as a chemical intermediate in the production of a wide range of chemicals, plastics and pharmaceuticals.

Hydrogen peroxide is used to treat waste water and sewage from industrial and domestic sources and for detoxifying organic pollutants in the environment. It is also used as a commercial disinfectant and antimicrobial agent. Hydrogen peroxide is a component in some types of rocket fuel as it is extremely reactive. Hydrogen peroxide at low concentrations (around 3-6%) is used in peroxide-based hair dyes.

Exposure to large amounts of hydrogen peroxide is most likely to occur in an occupational setting. However, the general public may be exposed to small amounts due to its use in many domestic products.

Hydrogen peroxide is toxic at high concentrations by all routes of exposure, whether it is ingested, inhaled or comes into contact with the skin and eyes, producing effects at the site of contact.

Hydrogen peroxide is an irritant. Inhalation of hydrogen peroxide vapours causes irritation to the nose, throat and respiratory tract. In severe cases an accumulation of fluid in the lungs may occur, which can potentially be fatal. Ingestion may cause abdominal pain, foaming at the mouth, vomiting which may include blood, gastric bloating, fever, lethargy and unconsciousness. High concentrations will cause irritation and corrosion to the gastrointestinal tract and may cause death.

Skin contact with dilute solutions of hydrogen peroxide may cause whitening or bleaching of the skin. Contact with high concentrations of hydrogen peroxide can cause irritation and redness, corrosion, severe burns, blisters, ulcers and permanent scarring. Eye contact with high concentrations of hydrogen peroxide can cause pain, running of the eyes, conjunctivitis, sensitivity to light, severe eye burns and permanent injury including blindness.

Children exposed to hydrogen peroxide are expected to show similar effects to adults. Exposure to hydrogen peroxide during pregnancy is not likely to cause damage to the unborn child since it is rapidly detoxified with only a minimal amount getting into the blood.

The International Agency for Research on Cancer (IARC) has concluded that hydrogen peroxide is not classifiable as to its carcinogenicity to humans (group 3).

Frequently Asked Questions

What is hydrogen peroxide?
Hydrogen peroxide is a colourless liquid with a slightly sharp odour, which is unstable and flammable under heating, friction or when contaminated.

How does hydrogen peroxide get into the environment?
Hydrogen peroxide occurs naturally at very low levels in the air and water, in human and plant tissue and bacteria and in some food and drinks. It is produced industrially in large quantities and it may enter the environment from workplaces where it is manufactured or used.

How will I be exposed to hydrogen peroxide?
Hydrogen peroxide at high concentrations is toxic by all routes of exposure, whether it is ingested, inhaled or comes into contact with the skin and eyes. Exposure to large amounts of hydrogen peroxide is most likely to occur in an occupational setting. However, you may be exposed to small amounts of hydrogen peroxide at low concentrations due to its use in domestic products such as chlorine-free bleach and hair dye.

If there is hydrogen peroxide in the environment will I have any adverse health effects?
The presence of hydrogen peroxide in the environment does not always lead to exposure. Clearly, in order for it to cause any adverse health effects you must come into contact with it. You may be exposed by breathing, eating, or drinking the substance or by skin contact. 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.

Hydrogen peroxide is an irritant. Inhalation of hydrogen peroxide will cause irritation to the nose, throat and respiratory tract. Ingestion of high concentrations will cause abdominal pain, foaming at the mouth, vomiting, bleeding of the gastrointestinal tract, gastric bloating, fever, lethargy, unconsciousness and in severe cases death. Skin contact with low concentrations of hydrogen peroxide cause a whitening of the skin. High concentrations of hydrogen peroxide can cause irritation and redness, corrosion, severe burns, blisters, ulcers and permanent scarring following skin contact. Eye contact with high concentrations of hydrogen peroxide can cause pain, running of the eyes, conjunctivitis, sensitivity to light, severe eye burns and permanent injury including blindness.

Can hydrogen peroxide cause cancer?
There is no evidence to suggest that exposure to hydrogen peroxide would cause cancer in humans.

Does hydrogen peroxide affect children or damage the unborn child?
Children exposed to hydrogen peroxide would be affected in the same way as adults. There is no evidence to suggest that exposure to hydrogen peroxide can affect the health of the unborn child.

What should I do if I am exposed to hydrogen peroxide?
If you have got hydrogen peroxide on your skin remove soiled clothing, wash the affected area with lukewarm water and soap for at least 10 – 15 minutes and seek medical advice.

If you have got hydrogen peroxide in your eyes remove contact lenses, wash the affected area with lukewarm water for at least 10 – 15 minutes and seek medical advice.

If you have ingested hydrogen peroxide seek medical advice.