

Health and Safety Services

Guidance on the First aid treatment of cyanide, hydrofluoric acid and phenol exposure

Introduction

1. Exposure to certain chemicals requires specialist first aid treatment. This document gives guidance to those who work with or may want to work with these substances on the first aid requirements needed in the event of exposure to the following:

[Cyanide and its compounds](#)

[Hydrofluoric acid](#)

[Phenol](#)

Select the link above to go to the chemical-specific information you require.

2. The information below is to be read and any necessary arrangements made **before** the work commences so that users are prepared and aware of what action to take. The COSHH risk assessment must take into account this guidance and other aspects of safe working with these substances.

Cyanide and its Compounds

3. Cyanide preparations are commonly used in many chemical experiments and with a few exceptions almost all cyanide compounds are extremely deadly poisons. Cyanide may be absorbed into the body by mouth, by inhalation and even by absorption through intact skin.
4. Prior to use supervisors of the work must ask themselves the questions “**Is cyanide usage essential?**” and “**Can the results be achieved by other safer means?**” The decision to use cyanide must not be taken lightly and a detailed COSHH assessment of the specific risks in each situation where cyanide is to be used must be made and appropriate control measures identified.

Procedure

5. **Details of the work to be undertaken must be discussed with the School Safety Advisor (who may seek further advice from the University First Aid Coordinator) prior to work commencing.**
6. Where cyanide is to be used at least one person in the group must be a qualified first aider unless there is a qualified person in another group within close proximity. In addition all users must attend a training course in emergency first aid relating to what actions to take in the event of cyanide exposure. This course will be run by the First Aid Coordinator.
7. Each group that plans to use cyanides must first ensure that a trained first aider will be available during the experiment. The first aider will have a first aid kit and

oxygen available for use in the event of exposure. This kit will be available from the First Aid Coordinator.

8. When dealing with a case of suspected cyanide exposure speed of response is essential. In all cases the first course of action should be to call for an ambulance where cyanide exposure is suspected, warning signs are: -

1. Irritation of eyes, nose and throat
2. Dizziness, nausea, general weakness, headache, flushing or occasionally pale skin, palpitations.
3. A feeling of suffocation followed by deep, breathing, sudden unconsciousness, cessation of breathing and of heart function. The breath may have a characteristic smell of almonds.

Principles of first aid for suspected cyanide exposure include: -

1. Protect yourself and the casualty from further exposure and contamination during decontamination and treatment. Gloves and appropriate clothing should be worn during the procedure.
2. Note: Do not enter if you suspect gaseous cyanide is present. The casualty will need to be rescued by someone wearing self-contained breathing apparatus i.e. fire brigade.
3. Maintain the casualty's airway, breathing and circulation. If the casualty is breathing give oxygen via mask. If the casualty is not breathing, resuscitation will be required via bag and mask.

Inhalation

- Quickly remove casualty from exposure, preferably to fresh air.
- Keep them warm and at rest.
- Oxygen should be given if trained to do so.
- If breathing has ceased, apply artificial respiration using a bag and mask resuscitator if trained in its use.
- DO NOT USE MOUTH-TO-MOUTH RESUSCITATION OR YOU MAY BE CONTAMINATED

Skin Contact

- Remove all contaminated clothing immediately.
- Wash the skin with plenty of water for at least 10 minutes.
- Treat the casualty as for inhalation.

Eye Contact

- Immediately irrigate with water for at least 10 minutes.
- Treat as for inhalation.

Ingestion

- Do not give anything by mouth.
 - Treat as for inhalation.
9. Training in how to carry to these procedures and how to use oxygen will be part of the course for dealing with exposure.

Hydrofluoric Acid

10. Hydrofluoric acid is an extremely corrosive inorganic acid which can cause severe burns to skin and eyes. If it comes into contact with the skin the fluoride ions readily penetrate the skin and enter the deep tissue layers causing liquefaction necrosis of the soft tissues and decalcification and corrosion of the bone. The tissue destruction is accompanied by severe excruciating pain.
11. Prior to using hydrofluoric acid supervisors of work must ask themselves “**Is hydrofluoric acid use essential?** and **Can the results be achieved by other safer means?**” If not then the COSHH assessment should detail appropriate precautions to be taken when using hydrofluoric acid, which includes a safe system of work. Any one needing to use hydrofluoric acid needs to be given adequate information and training on the hazards to health posed by hydrofluoric acid and the precautions to take to avoid them.
12. Anyone proposing to use hydrofluoric acid should: -
 - Produce a COSHH risk assessment for the work being undertaken and identify suitable control measures to deal with any hazards.
 - Always use the protection identified by the COSHH risk assessment.
 - Always wash gloves and other impervious clothing before removing them
 - Test gloves for pinholes using a method advised by manufacturers.
 - Always wash hands before leaving work area.

Procedure

13. **Details of the work to be undertaken must be discussed with the School Safety Advisor (who may seek further advice from the University First Aid Coordinator) prior to work commencing.**
14. Where hydrofluoric acid is to be used at least one person in the group must be a qualified first aider unless there is a qualified person in another group within close proximity. In addition all users must attend a training course in emergency first aid relating to what actions to take in the event of hydrofluoric acid exposure. The course will be run by the First Aid Coordinator.
15. If hydrofluoric acid exposure is thought to have happened then urgent action is required and immediate medical attention must be obtained. When giving first aid protect yourself and the casualty from further exposure. Casualties should be sent to hospital as soon as possible. In all cases the hospital should be informed of the cause of the injury.

Skin Contact

- Remove the contaminated clothing while protecting your hands with suitable gloves.
- Flood the skin with plenty of water for at least 5 – 10 minutes.

- Apply calcium gluconate gel on and around the affected areas and continuously massage it into the skin until at least 15 minutes after pain is relieved. Cover the area with a dressing soaked in the gel and lightly bandage. These procedures can be continued during transit to hospital.
- Send to Accident and Emergency.

Eye Contact

- Flush the eye with water for at least 20 minutes, this can be continued during transit to hospital.
- Send casualty to Accident and Emergency or local eye casualty department.

Inhalation

- Remove the casualty from the contaminated area and place in fresh air.
- If necessary, resuscitate the casualty.
- If suitably trained give oxygen
- Send to Accident and Emergency

Swallowing

- Never attempt to induce vomiting
- If the casualty is conscious rinse out their mouth with water.
- Send to Accident and Emergency

Phenol

16. This guidance is **for your protection** and **you should read it before using phenol** and show it to any First Aider / Ambulance Staff / Hospital Staff if you have direct contact with phenol
17. Phenol is a white crystalline solid, which liquefies on contact with water. It has a characteristically acrid odour and sharp burning taste. It is used as a starting material for a variety of chemicals. It is corrosive and diluted preparations of phenol solutions may also burn or irritate the skin. Phenol is well absorbed when swallowed, breathed in or in contact with skin. Phenol is extremely poisonous and corrosive. It can be absorbed across intact skin. As it initially may have anaesthetic effects, the phenol may cause extensive tissue damage **before** the casualty feels any pain.
18. In the event of direct contact with phenol, the casualty must be sent immediately to the Accident and Emergency Unit.

N.B. - A copy of this guidance for phenol exposure should accompany the casualty
19. **Details of the work to be undertaken must be discussed with the School Safety Advisor (who may seek further advice from the University First Aid Coordinator) prior to work commencing.**
20. Where phenol is to be used at least one person in the group must be a qualified first aider unless there is a qualified person in another group within close proximity. In addition all users must attend a training course in emergency first aid relating to what actions to take in the event of phenol exposure. The course will be run by the First Aid Coordinator.

First Aid

Skin Contact

- Remove any contaminated clothing immediately avoiding contamination of unaffected areas.
- Wear appropriate protective gloves to avoid further contamination or injury to first aider.
- Flush the affected skin area with **copious** amounts of water for a minimum of 10 - 15 minutes to remove any phenol which may be lying on the surface of the skin (not yet absorbed).
- After the initial irrigation with water, apply Polyethylene Glycol (Molecular Weight 300) commonly called PEG300 or Macrogol 300 for at least 30 minutes or until the casualty receives treatment at the A&E Unit.
- The PEG 300 solution (made from 70 parts polyethylene glycol/30 parts methylated spirits) should be available in all labs where phenol is used.

Eye Contact

21. In the event of eye contact there will be severe pain and redness.

- Irrigate the affected eye with **copious** amounts of running water
- Send to the Accident and Emergency Unit immediately.

Ingestion

- If swallowed wash to mouth out with plenty of water and give the casualty water to drink.

Notes for Ambulance Staff / Hospital Staff

NOTE: Do not touch affected tissue with bare hands

Patients with corneal ulceration should be referred immediately for an ophthalmological examination / assessment.

Phenol is absorbed through intact skin and this may cause symptoms similar to those observed from inhalation and ingestion of phenol. Polyethylene glycol molecular weight 300 inactivates any phenol absorbed.

Inhalation of phenol may cause breathlessness and pulmonary oedema for which positive pressure ventilation should be used. Remove any casualty suspected of exposure to fresh air and refer to A & E.

Possible complications of phenol absorption include hyperpyrexia, gut perforation and renal failure.

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Related Procedures	
Related Guidance:	A-Z of documents on specific health & safety topics, at http://www.campus.manchester.ac.uk/healthandsafety/CoPs&Guidance.htm
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