

NDMRB-RA-037

Risk Assessment: Working with cyanide and cyanide containing compounds

Scope

This document provides guidance on how to manage risks during the storage, handling and use of cyanides. It includes guidance on recognising symptoms of cyanide poisoning and responding to cyanide exposure in the workplace. Throughout this document, the term 'cyanides' means cyanide salts like sodium or potassium cyanide, and hydrogen cyanide gas. Most cyanides are fast acting and highly toxic chemicals which can exist in various forms, for example, hydrogen cyanide is a colourless gas or liquid and cyanide salts like sodium cyanide or potassium cyanide are crystalline solids. Hydrogen cyanide is extremely flammable. Cyanides are used in the chemicals industry in the production of other chemicals.

Cyanides are often described as having an odour of bitter almonds, however, not everyone can detect this smell. At higher concentrations the sensory receptors can become overloaded which means, even for people who can normally smell cyanides, the odour cannot be perceived. The sense of smell should never be relied on as a means to detect cyanides. Most cyanides are highly toxic. Before using a chemical in the NDMRB, the Material Safety Data Sheet (MSDS) should be referred to as it contains relevant information on the chemical's hazards, potential routes of exposure and instructions on its safe use, handling, storage and disposal.

The main route of exposure to cyanides in the workplace is through inhalation. This results in fast absorption and circulation around the body. Exposure to cyanides through ingestion is less common and cyanide poisoning can result from absorption through eye or skin contact. Attention should also be paid to preventing skin and eye contact as well as inhalation.

Acute poisoning

Depending on the level of exposure, the level of poisoning can be described as *mild* or *moderate to severe*.

Mild poisoning can produce the following symptoms:

- headache
- anxiety
- dizziness
- nausea and vomiting—particularly if the cyanide has been ingested
- shortness of breath and a sense of suffocation
- General weakness with heaviness of arms and legs.

If treatment is not started quickly, symptoms may progress and the person's condition can deteriorate to include signs of:

- increased shortness of breath or gasping for air
- falling blood pressure
- cardiac arrhythmia—disturbance in heart rhythm and pulse
- cyanosis—blue or purple colouration of the skin or mucous membranes
- Deteriorating levels of consciousness.

Moderate to severe poisoning results from exposure to higher concentrations of cyanides and symptoms include:

- rapid loss of consciousness
- seizures
- gasping for breath, weakness or absence of breathing
- Cardiac arrest.

Death may occur within a few minutes of exposure to moderate or high amounts of cyanides. Survivors may suffer brain injuries due to toxic effects or lack of oxygen.

First-aid treatment for cyanide poisoning

- Speed is essential
- Arrange for immediate medical attention and therefore probable transfer to hospital
- Protect yourself and the casualty from further exposure during decontamination and treatment

Only competent and approved staff members may use cyanides. All staff who work with cyanides must follow the instructions in the following RA and must sign off that they have read and understood all safety information regarding the use of cyanides. Oxygen is not kept on site in case of emergencies, in the event of an accident involving cyanides the emergency services must be contacted immediately.

Accurate records of the amounts of cyanides used will be kept and held by the medicinal chemistry group.

Name of assessor:	Paul Brennan	Date of Assessment:	Oct 2015	Review Date:	Every 3 years
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Risk Matrix:

Risk Matrix		Likelihood			
		High	Medium	Low	Negligible
Consequence	Severe	High	High	Medium	Effectively Zero
	Moderate	High	Medium	Medium/low	Effectively Zero
	Insignificant	Medium/Low	Low	Low	Effectively Zero
	Negligible	Effectively Zero	Effectively Zero	Effectively Zero	Effectively Zero

Risk Assessment:

Hazard (Cause and consequence)	Affected Groups	Existing controls	Risk	Further Action
Exposure to skin, eyes, airways and mucous membranes	Staff	<u>Lab coat, safety glasses, gloves and a fume hood must be used at all times when handling cyanides</u>	Medium	None
Inhalation	Staff	Cyanides must be handled in a fume hood at all times. In the event of exposure through inhalation: Remove patient from exposure. Keep warm and at rest. Oxygen should be administered. Do not use mouth-to-mouth resuscitation.	Medium	None
Skin contact	Staff	Lab coat and gloves must be worn at all times In the event of skin contact: Remove all contaminated clothing immediately. Wash the skin with plenty of water. Treat patient as for inhalation	Medium	None
Eye Contact	Staff	Wear safety glasses at all times when handling cyanides In the event of contact with eyes: Immediately irrigate with water for at least ten minutes. Treat patient as for inhalation		
Ingestion	Staff	Never put anything from the lab into your mouth. Wash hands thoroughly before leaving the lab. In the event of ingestion: Do not give anything by mouth. Treat patient as for inhalation.		

Signed By Author:

Approved by (sign and print):

Reviewed by:

Review date: