



Mineral Process Control (MPC) Pty Ltd

Unit 3, 30 Furniss Rd
LANDSDALE 6065
WESTERN AUSTRALIA
ABN 42 009 416 193

Tel: (08) 9303 2334
Fax: (08) 9303 2336
Email: info@mpcwa.com

MATERIAL SAFETY DATA SHEET

Product: Assay Tabs

SECTION 1 - IDENTIFICATION

Product Name:	Assay Tabs
Other Names:	Sodium Cyanide (~75%)
Recommended Use:	Gold Assay Laboratory consumable
Company:	Mineral Process Control Pty Ltd ABN 42 009 416 193
Address:	Unit 3, 30 Furniss Rd LANDSDALE WA 6065
Telephone Number:	(08) 9303 2334
Emergency Telephone Number:	(08) 9303 2334, or 0409 118 355

SECTION 2 – HAZARDS IDENTIFICATION

This material is hazardous according to criteria of ASCC; HAZARDOUS SUBSTANCE. Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

Risk Phrases: Very toxic by inhalation, in contact with skin and if swallowed.
Contact with acids liberates very toxic gas.
Danger of cumulative effects
May cause harm to unborn child

Safety Phrases: Keep container tightly closed. Do not breathe dust. Do not release to the environment. In case of accident or if you feel unwell, seek medical advice immediately (show the label whenever possible).

Poisons Schedule: S7 Dangerous Poison.

SECTION 3 – COMPOSITION

Ingredients

Chemical Entity	CAS number	Proportion
Sodium Cyanide	143-33-9	75% (approx)
Lead Nitrate	10099-74-8	<1%
Organic Oxidants Mixture	No Specific	~25%

For advice, contact a Poisons Information Centre (Phone eg. Australia 131 126; New Zealand 0 800 764766) or a doctor at once. Urgent hospital treatment is likely to be needed.

Cyanide poisoning - first aid and medical treatment

Properties

Cyanide is a rapidly acting and extremely toxic chemical that exists in various forms. Depending on temperature, it can be a colourless gas or liquid (e.g. hydrogen cyanide –HCN, cyanogen) or a solid (e.g. sodium or potassium cyanide). Cyanide is described as having a bitter almond odour at concentrations greater than 1 ppm, but not everyone can detect this.

Routes of absorption

The primary route of occupational exposure is through inhalation, which results in rapid absorption into the systemic circulation. A less common route in the occupational setting is through ingestion. Cyanide can also be absorbed through the eyes or intact skin.

Mechanism of action

Cyanide inhibits cytochrome oxidase at the cellular level, preventing cells from using oxygen. This impairs the function of vital organs.

Cyanide poisoning

The onset of symptoms following cyanide exposure depends on:

- a) the form of cyanide;
- b) the mode of entry into the body; and
- c) the dose.

Acute

Mild poisoning - This may manifest as anxiety, headache, nausea and vomiting, mucous membrane irritation, metallic taste, shortness of breath and dizziness.

Progression of poisoning - Signs of deterioration include increasing shortness of breath, falling blood pressure, cardiac arrhythmia, periods of cyanosis and a deteriorating level of consciousness.

Moderate and severe poisoning - Exposure to cyanide gas produces the most rapid onset of symptoms. High concentrations of inhaled cyanide result in rapid loss of consciousness with seizures, difficulty breathing and cardiac arrest, with death occurring within a few minutes. Survivors may suffer brain injury due to either a direct toxic effect or anoxia (lack of oxygen).

Eyes - Direct contact with cyanide in caustic solutions is irritating to the eyes. Cyanide can also be absorbed into the body through the eyes.

Skin - Cyanide in caustic solution is corrosive to the skin and can also be fairly rapidly absorbed through the skin.

Chronic

Chronic exposure may result in symptoms of headache, eye irritation, fatigue, chest symptoms and nose bleeds. This is uncommon as cyanide is broken down to thiocyanate in the body and excreted.

Rescue and first aid

The first priority is to remove the casualty from further exposure – ideally move to a source of fresh air.

The trained rescuer should have donned appropriate respiratory and dermal personal protective equipment (PPE), especially gloves, goggles and an appropriate respirator if hydrogen cyanide or liquid cyanide is involved.

Airway - Clear and insert oral airway if casualty is unconscious and not breathing. If breathing, place in coma position.

Breathing - Mouth-to-mouth resuscitation should be avoided due to the risk of contamination to the rescuer. If not breathing, use a resuscitation bag and mask. Provide 100% oxygen by mask with a non-return valve if available.

Circulation - Check for pulse. Commence external cardiac massage if absent.

Oxygen

Oxygen (100%) is considered the most useful treatment for early cyanide poisoning and should be administered to anyone exposed to cyanide, whether conscious or unconscious, breathing or not breathing.

Each site needs to undertake a risk assessment to determine the appropriate quantity and location of oxygen that should be available on site, taking into consideration the numbers of potentially exposed personnel and the duration to reach a tertiary care facility.

Decontamination

Remove any contaminated clothing and ensure these items are placed in a sealed collection bag. Wash down the casualty with copious amounts of fresh water.

Treatment should not be delayed by decontamination procedures and should be started immediately.

Transfer

Arrange urgent transfer to the nearest hospital or, if remote, nearest doctor. The casualty should be accompanied by someone trained in cardiopulmonary resuscitation (CPR) and able to continue resuscitation. The cyanide antidote kit should accompany the person.

Ingestion

There is little evidence to support the benefit of emesis (vomiting), gastric lavage or charcoal administration, especially when more than 2 hours have lapsed since ingestion. This form of treatment should only be used on the advice of an emergency physician or toxicologist.

Eye contamination

This should be managed with copious irrigation using water or normal saline for at least 5 minutes.

Cyanide antidotes and kits

The use of antidotes is not as immediately critical as the administration of effective first aid, oxygen and life support measures.

Mild poisoning

Administration of 100% oxygen may be all that is needed.

If the casualty rapidly improves after removal from cyanide exposure then no further immediate management beyond supplemental oxygen is required.

Progression of poisoning

If there is evidence of deterioration, despite 100% oxygen administration, and there is a convincing history of exposure, administration of an antidote may be indicated, particularly if there is loss of consciousness or cardiovascular instability.

The preferred antidote is hydroxycobalamin administered intravenously. Oxygen should continue to be administered.

Moderate and severe poisoning

Continue administration of 100% oxygen.

Advanced life support may be required if the casualty is in shock or having seizures, with due caution to the protection of the care giver.

Preferably insert two intravenous lines.

Monitor heart and blood pressure, and pulse oximetry if available.

Monitor level of consciousness using the Glasgow Coma Scale (GCS).

Take 10 ml blood in a sodium heparin or sodium fluoride tube for analysis of blood cyanide levels to confirm the diagnosis. The sample should be chilled but not frozen and transferred to a laboratory capable of undertaking cyanide measurements. Treatment should not be delayed while awaiting test results. Note that as most cyanide is in the red blood cells, the levels in the blood may not accurately reflect the true level of free cyanide and symptoms should therefore guide treatment.

Intravenous administration of an antidote

• **Hydroxycobalamin** is available through the Therapeutic Goods Administration (TGA) Special Access Scheme. It reacts with cyanide to form cyanocobalamin, which is excreted by the kidneys.

Dose: Administer 5-15 g hydroxycobalamin intravenously (Cyanokit® contains two 2.5 g bottles) over 30 minutes or faster if the casualty's condition is deteriorating.

• **Sodium thiosulphate** is no longer a preferred antidote as it is a slower acting agent. However, it is considered by some authorities to be useful as an adjunct to hydroxycobalamin.

• **Kelocyanor** (dicobalt edetate) is no longer a preferred antidote as there is the potential for a severe adverse reaction if administered when cyanide poisoning has not occurred. It should only be used where there is unequivocal evidence of cyanide poisoning and hydroxycobalamin is not available. Even then, there may be a toxic reaction such as anaphylaxis, cardiac arrhythmia or convulsions. Co-administration of glucose may ameliorate this to some extent.

Antidote storage

The selected cyanide antidote should be stored in a sealed tagged container in an accessible area with the cyanide protocol enclosed. The contents of the container and the expiry date should be regularly checked. Intravenous fluids and cannulae and blood sample tubes should be available. The kit should be transported with the casualty to the hospital or doctor.

Monitoring in hospital

- Arterial blood gases (ABGs). Severe metabolic acidosis requires correction.
- Fluid and electrolyte balance.
- Neurological, respiratory and cardiovascular status. Watch for the development of pulmonary oedema and aspiration pneumonia in comatose patients. Seizures will require treatment with intravenous or rectal benzodiazepines.
- Further antidote administration may be required, particularly if there is a persisting metabolic acidosis. Oxygen therapy will be determined by the response to the antidote.
- Close monitoring should continue for a minimum 24-48 hour period following exposure if an antidote has been required as delayed effects may occur.
- Following skin exposure, a period of 6 hours of monitoring is required to ensure there are no delayed effects.
- Re-assessment of eye splashes is required within 24 hours, and ophthalmologic assessment is recommended.

Cyanide management plan

Each site should develop a medical management plan, including location and contact details of the nearest medical facility capable of treating a victim of cyanide poisoning.

References

Agency for Toxic Substances and Disease Registry (ATSDR), US Department of Health and Human Services, Toxicological profiles for and ToxFAQs Cyanide: viewed 27 July 2007 <www.atsdr.cdc.gov>

Braitberg G & Vanderpyl M, 2000, Treatment of cyanide poisoning in Australasia. *Emergency Medicine* 12, 232-240.

Cummings T, 2004, The treatment of cyanide poisoning. *Occupational Medicine* 54, 82-85. Micromedex® Healthcare series -Cyanide.

For further information regarding the health surveillance (Mine Health) and contaminant monitoring (CONTAM) systems managed by Resources Safety, please contact:

Email: contammanager@docep.wa.gov.au Phone: +61 8 9358 8108
Fax: +61 8 9358 8188
www.docep.wa.gov.au/ResourcesSafety
RSDApril08_626

The information contained in this bulletin is provided in good faith and believed to be reliable and accurate at the time of publication.

http://www.dmp.wa.gov.au/documents/Bulletins/MS_GMP_OH_MB5_CyanidePoisoning.pdf

SECTION 5 – FIRE FIGHTING MEASURES

Hazards from combustion products:

Non-combustible material.

Precautions for fire fighters and special protective equipment:

Decomposes on heating emitting toxic fumes, including those of hydrogen cyanide, and ammonia. If safe to do so, remove containers from path of fire. Fire fighters to wear self-contained breathing apparatus and suitable protective clothing if risk of exposure to products of decomposition.

Suitable Extinguishing Media:

Not combustible, however, if material is involved in a fire use: Water fog (or if unavailable fine water spray), foam, dry chemical powder.

Unsuitable Extinguishing Media:

Carbon dioxide.

Hazchem Code:

2X

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Emergency procedures:

Clear area of all unprotected personnel. Do not release to the environment. If contamination of sewers or waterways has occurred advise local emergency services.

Methods and materials for containment and clean up:

Avoid breathing in dust. Work up wind or increase ventilation. Wear protective equipment to prevent skin and eye contact and breathing in vapours/dust. DO NOT allow large amounts of the material to get wet. Contain - prevent run off into drains and waterways. Spillage area and contaminated solids can be detoxified by treatment with an excess of dilute sodium hypochlorite, calcium hypochlorite, or ferrous sulfate after the addition of soda ash or lime to raise the pH to greater than 10.5. Allow 1 hour for complete decomposition before washing spillage area down with large quantities of water to ensure maximum dilution. Collect and seal in properly labelled containers or drums for disposal.

SECTION 7 - HANDLING AND STORAGE

This material is a Scheduled Poison S7 and must be stored, maintained and used in accordance with the relevant regulations.

Conditions for safe storage:

Store in a cool, dry, well ventilated place and out of direct sunlight. Keep dry – reacts with water. Protect from moisture. Store away from foodstuffs. Store away from incompatible materials described in Section 10. Keep containers closed when not in use - check regularly for spills.

Precautions for safe handling:

Avoid skin and eye contact and breathing in dust. Avoid handling which leads to dust formation. Keep out of reach of children.

SECTION 8 – EXPOSURE CONTROLS

Occupational Exposure Limits:

No value assigned for this specific material by the National Occupational Health and Safety Commission. However, Exposure Standard(s) for constituent(s):

Cyanides (as CN): 8hr TWA = 5 mg/m³, Sk

Decomposition product(s):

Hydrogen cyanide: Peak Limitation = 11 mg/m³ (10 ppm), Sk

As published by the National Occupational Health and Safety Commission.

TWA - The time-weighted average airborne concentration over an eight-hour working day, for a five-day working week over an entire working life.

`Sk' Notice - absorption through the skin may be a significant source of exposure. The exposure standard is invalidated if such contact should occur.

Peak Limitation - a ceiling concentration which should not be exceeded over a measurement period which should be as short as possible but not exceeding 15 minutes.

These Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable.

These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Engineering controls:

Ensure ventilation is adequate and that air concentrations of components are controlled below quoted Exposure Standards. Avoid generating and breathing in dusts. If inhalation risk exists: Use with local exhaust ventilation or while wearing air supplied mask. Keep containers closed when not in use.

Personal Protective Equipment:

The selection of PPE is dependant on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

Personal Protection Equipment such as overalls, full face shield, elbow-length impervious gloves, splash apron and rubber boots may need to be considered. Use with adequate ventilation. If inhalation risk exists, wear air-supplied mask meeting the requirements of AS/NZS 1715 and AS/NZS 1716. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Form:	Solid
Colour:	White with Rose Specs
Odour:	Faint Bitter Almonds
Melting Point (°C):	~560
Boiling Point (°C):	not applicable
Specific gravity:	1.6
Vapour Pressure:	not applicable
Flashpoint:	not applicable
Solubility in Water:	Soluble
pH:	11 – 12 (5 – 25% Aqueous Solutions)
<u>Other Properties</u>	Tablet approximately 30mm diameter x 10mm Thick
Chemical group:	Mixture Containing ~75% Sodium Cyanide

SECTION 10 – STABILITY AND REACTIVITY

Chemical stability:

Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Conditions to avoid:

Avoid exposure to moisture during storage.

Incompatible materials:

Incompatible with acids , oxidising agents , moisture , and halogens .

Hazardous decomposition products:

Hydrogen cyanide. Ammonia.

Hazardous reactions:

Reacts with water or acids liberating toxic hydrogen cyanide gas. Hazardous polymerisation will not occur.

SECTION 11 – TOXICOLOGY INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion:

Swallowing can result in nausea, vomiting, diarrhoea, abdominal pain, convulsions and loss of consciousness. Collapse and possible death may occur.

Eye contact:

May be an eye irritant. Exposure to the dust may cause discomfort due to particulate nature. May cause physical irritation to the eyes.

Skin contact:

Contact with skin may result in irritation. Can be absorbed through the skin. Effects can include those described for 'INGESTION'.

Inhalation:

Breathing in high concentrations may result in the same symptoms described for 'INGESTION'. High inhaled concentrations may lead to a feeling of suffocation and cause difficulty in breathing, headaches, dizziness and loss of consciousness. Can cause suffocation.

Long Term Effects:

Repeated or prolonged skin contact may lead to irritant contact dermatitis - 'cyanide rash' - characterised by itching and skin eruptions.

Toxicological Data:

Oral LD50 (rat): 6.44 mg/kg.

Dermal LD50 (rabbit): 10.4 mg/kg.

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity Data:

Marine pollutant. Sodium cyanide seems to be more toxic to aquatic life than terrestrial life.

Environmental Fate:

Moisture will cause slow decomposition into poisonous HCN and ammonia gases.

SECTION 13 – DISPOSAL CONSIDERATIONS

Disposal methods:

Refer to Waste Management Authority. Dispose of material through a licensed waste contractor. Empty containers must be decontaminated and destroyed. This material and container must be disposed of as hazardous waste.

SECTION 14 – TRANSPORT INFORMATION

UN No: 1689
Class-primary 6.1 Toxic
Packing Group: I
Proper Shipping Name: SODIUM CYANIDE, SOLID
Hazchem Code: 2X

Road and Rail Transport:

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

Marine Transport:

Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; DANGEROUS GOODS.

This material is classified as a Marine Pollutant (P) according to the International Maritime Dangerous Goods Code.

Air Transport:

Classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods

Regulations for transport by air; DANGEROUS GOODS.

SECTION 15 – REGULATORY INFORMATION

Classification:

This material is hazardous according to criteria of ASCC; HAZARDOUS SUBSTANCE.

Hazard Category:

T+ : Very Toxic

Risk Phrase(s):

R26/27/28: Very toxic by inhalation, in contact with skin and if swallowed.

R32: Contact with acids liberates very toxic gas.

R33: Danger of cumulative effects

R61: May cause harm to unborn child

Safety Phrase(s):

S7: Keep container tightly closed.

S22: Do not breathe dust.

S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label whenever possible).

S60: This material and its container must be disposed of as hazardous waste

S61: Do not release to the environment.

Poisons Schedule:

S7 Dangerous Poison.

This material is listed on the Australian Inventory of Chemical Substances (AICS).

SECTION 16 – OTHER INFORMATION

This MSDS summarises our best knowledge of the health and safety hazard information of the product and how to safely handle and use the product in the workplace. Each user must review this MSDS in the context of how the product will be handled, used and stored in the workplace. If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact us so that we can attempt to obtain any additional information from our suppliers.

The information herein is given in good faith but no warranty, express or implied is made.

The onus is on the user to take appropriate precautions for the safe handling, storage and transport of this product.

Please read all labels carefully before using product.

Last updated January 2012.