



Cyanide Salts

(and suspension/ solutions)

Covers: Potassium, sodium, silver, potassium silver, copper, gold and zinc cyanides

Laboratories should create their own SOP's for the use of Cyanides Salts

Hazards

Potential Hazards

- All above-mentioned cyanide salts are acutely toxic, **fatal in contact with skin, if inhaled or if swallowed**. All are **high risk for skin toxicity** (category 1); **potassium and sodium cyanide** are also **high risk for inhalation** (category 1). Doses in milligram quantities can be **fatal**.
- All above-mentioned cyanide salts will **react with acid** (or water, including moisture in the air) to form **hydrogen cyanide**, a flammable and toxic gas that may product a bitter almond odor.
- **Potassium** and **sodium cyanide** are cause **target organ damage**, with single exposures targeting the brain, heart and testes; repeat exposure may affect the thyroid.
- **Potassium, sodium** and **silver cyanide** may also corrode metal, cause eye damage or irritate skin.
- *These compounds inhibit cellular respiration, which lead to anoxia. Cyanide poisoning is associated with blue skin discoloration (cyanosis) but the cyanide-hemoglobin reaction can cause pink/cherry red skin. Initial symptoms of exposure are difficulty breathing, weakness, headache, dizziness, nausea and vomiting.*
- Toxic metal cyanides (cadmium, nickel, mercury) have other hazards not covered here.
- For specific recommendations and hazard information see manufacture's Safety Date Sheets (SDS) or search for chemical at the [New Jersey Right to Know Fact Sheets](#).

Exposure Response

Medical Treatment and First Aid

Immediate first and medical treatment is essential for people exposed to cyanide salts or hydrogen cyanide. People working in and around cyanide salts must be familiar with the first aid procedures in these guidelines
For an actual or suspected chemical exposure/injury:

- **Do not wait for symptoms to develop. Seek immediate medical attention at the emergency department for ANY suspected exposure.** The SDS should be taken to the emergency department if possible. Follow **FIRST AID INSTRUCTION** below.
- **Persons helping an exposed colleague must wear PPE as indicated on this guideline (2pairs of nitrile gloves, splash goggles, fastened lab coat, and protective sleeves).**
- Call 911 (In Borwell, Rubin and Williamson, dial 5555) to request assistance and/or emergency transport. **Inform them that this is a possible cyanide poisoning and that cyanide antidote should be available.** Provide details of exposure including the compound, potential dose, route of exposure, time since exposure, and any specific symptoms.

Provide FIRST AID immediately
(and during transit to Emergency Department as indicated)

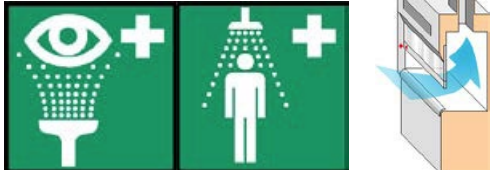

Skin exposure: Take off contaminated clothing immediately (before transported or flushing); wash skin with soap and plenty of water.

Eye exposure: Immediately flush the eyes at an eye wash station for at least 15 minutes. Continue rinsing eye during transportation to a medical facility and while waiting to see a physician.

Inhalation: Move all persons to fresh air. If not breathing, give artificial respiration using a suitable mechanical device. Do not use mouth-to-mouth resuscitation.

Ingestion: Do Not Induce Vomiting

- After receiving medical treatment, complete an incident report

<p>Selection & Purchase</p>	<ul style="list-style-type: none"> • Consider safer alternatives. • Purchase the smallest quantity feasible • When possible, order the material as granules instead of powder. • Keep a portable bottle of sterile (non-expired) eyewash flushing solution in the lab. 	
<p>Storage & Transport</p>	<ul style="list-style-type: none"> • Cyanide salts must be in sealed shatter-resistant containers during transportation. Use a secondary container if the container is not shatter resistant. • Store in secondary container below eye level. Consider storing in a locked cabinet. • Keep cyanide salts away from acids and water. • Store away from incompatibles such as strong oxidizers and CO₂. (See SDS for specifics.) • Potassium, silver, and potassium silver cyanides are light sensitive. 	
<p>Engineering Controls & Safety Equipment</p>	<ul style="list-style-type: none"> • Eyewash-drench hose required in immediate work area. • Safety shower may be required when using large volumes. • All work must be done in a chemical fume hood. 	
<p>Work Practice Controls</p>	<ul style="list-style-type: none"> • Designate a specific work area for cyanide salts and solutions and label it. • Never work alone when handling cyanides. • Line work area with absorbent, leak-proof bench pads. • If weighing, place balance in hood OR use Tare Method • Use an anti-static gun if powder sticks to sides of vial, etc. • Protect vacuum lines and pumps using filters or scrubbers. • Decontaminate the work area: <ul style="list-style-type: none"> ○ Carefully fold bench pad keeping contaminated surface inward. Place in waste container and seal; dispose as P-list chemical waste. ○ Wash contaminated surfaces, glassware, and equipment using a pH 10 buffer solution; rinse with 10% bleach solution. • Maintain awareness of the pH of cyanide salt solutions. (An acidic pH will release flammable and highly toxic hydrogen cyanide gas.) 	<div style="border: 2px solid red; padding: 5px; text-align: center;"> <p>Cyanide Work Area: Toxic!</p> </div> <p>Tare Method</p> <ol style="list-style-type: none"> 1. Tare (pre-weigh) empty container with lid 2. Go to hood, add powder, close lid. 3. Go to balance to weigh. 4. Return to hood.
<p>Personal Protective Equipment (PPE)</p>	<ul style="list-style-type: none"> • Dartmouth College has a Policy on PPE for Chemistry • Wear closed-toed shoes and clothing covering the legs. • Minimum PPE: <ul style="list-style-type: none"> ○ Lab coat ○ Safety goggles ○ 2 pairs of 5 mil NEOPRENE gloves • Dartmouth College Stockrooms provide Purple Nitrile Gloves which have a thickness of 0.09-0.15 mm from Cuff to Middle Finger. • Change gloves immediately if contaminate & every two hours. • Wash Hands at time of glove change and after removing gloves • <i>Check the manufacture's glove guide or glove effectiveness with any solvent you are using.</i> 	

Other Emergencies & Spills	<ul style="list-style-type: none"> • For fire or potential for a fire – Pull nearest fire alarm pull station, evacuate the building and go to a safe location to dial 911. (In Borwell, Rubin and Williamson, dial 5555) • Use ABC Dry Chemical Fire Extinguisher • DO NOT USE a Carbon Dioxide (CO₂) Fire Extinguisher for a fire involving or near cyanide salts • Serious injury or exposure to a hazardous material -- dial 911. <ul style="list-style-type: none"> ○ Skin exposure: <u>Take off contaminated clothing immediately</u> (before transported or flushing); wash skin with soap and plenty of water. ○ Eye exposure: Immediately flush the eyes at an eye wash station for at least 15 minutes. Continue rinsing eye during transportation to a medical facility and while waiting to see a physician. ○ Inhalation: Move all persons to fresh air. If not breathing, give artificial respiration using a suitable mechanical device. Do not use mouth-to-mouth resuscitation. ○ Ingestion: Do Not Induce Vomiting ○ Continue flushing until EMS arrives • Spill is beyond your ability to control (See Spill below) Contact EHS 603-646-1762 or after hours contact Dartmouth Safety and Security at 603-646-3333. • Any spill of non-water cyanide solution Remove everybody from the room and contact EHS 603-646-1762 or after hours contact Dartmouth Safety and Security at 603-646-3333. • Spills of dry powder or water-based solutions <i>outside the hood</i>: Remove everybody from the room and contact EHS 603-646-1762 or after hours contact Dartmouth Safety and Security at 603-646-3333. • Spills inside hood: <ul style="list-style-type: none"> ○ Small (<10 mg) amounts of powder or granules: wear PPE indicated above and wet an absorbent pad with pH 10 buffer solution, cover the spill, and wipe up carefully. ○ <10 ml spill of water-based solutions: wear PPE indicated above; use absorbent pads. • Clean spill area thoroughly with pH 10 buffer solution followed by a 10% bleach solution. • Label spill debris as hazardous waste. Store double-bagged in hood until pickup.
Waste	<ul style="list-style-type: none"> • Label any waste containers with the appropriate waste labels. • Store in secondary containers. • For waste pick up and disposal contact Dartmouth EHS by e-mailing ehs@dartmouth.edu
Training	Dartmouth College requires certain training for employees. For this chemical Laboratory Safety/ Hazardous Waste Management is required. This training is mandatory for all personnel working in a teaching or research wet laboratory. It is an introductory program on laboratory safety and waste management in a biomedical, engineering, chemistry, earth science or physics lab at Dartmouth College. The course takes approximately 45 minutes to complete. Completion is required every three years.
Medical Surveillance	The Permissible Exposure Limit (PEL) is 5 mg/m ³ , the PEL for hydrogen cyanide is 10ppm.
Monitoring Requirements	
Questions	Contact Dartmouth Environmental Health and Safety by e-mailing us a ehs@dartmouth.edu calling 603-646-1762 or visting our website .

“I have read and understand this Guidelines. I agree to fully adhere to its requirements.”

Last	First	Dartmouth ID	Signature

Acknowledgement: Special thanks for Duke’s Occupational & Environmental Safety Office for their permission to use this great design for our chemical guidelines. All Dartmouth High Hazard Guidelines are based on [Duke OESO Chemical SOP’s and Guidelines](#)