

Cyanide Safe Use Guidelines

Procedure: 6.07
Version: 1.0

Created: 3.1.2013
Effective 5.7.2013

A. Purpose

The guidelines were developed to provide procedures for the purchase, storage and safe use and response to occupational exposure to Cyanide in Columbia University laboratories.

B. Applicability/Scope

These guidelines apply to all Columbia University laboratory personnel, who store, handle or use cyanide or cyanide compounds.

C. Responsibilities

1. Principal Investigators (PI):

- a. Develop and maintain a detailed SOP in accordance with policy guidelines.
- b. Ensure that all lab personnel handling or working with cyanide compounds have taken the appropriate safety training: Laboratory Safety Training (TC0950) and Cyanide Safety Training (TC0085). Provide task specific training to lab staff.
- c. Ensuring cyanide compounds are stored safely and securely.
- d. Ensuring cyanide waste is collected in accordance with this policy.

2. User (s):

1. Attending safety training.
2. Following task specific SOPs.
3. Reviewing this policy.
4. Storing cyanide compounds in accordance with this policy.
5. Collecting cyanide waste in accordance with this policy.

3. Environmental Health and Safety (EH&S):

- a. Help users in developing and practicing safe work procedures.
- b. Providing appropriate safety training, as needed.
- c. Picking up the waste and disposing of it in accordance with all applicable regulations.
- d. Certifying chemical fume hoods annually.

D. Definitions

Background:

Cyanide is listed as extremely hazardous substances, under 40 CFR parts 302 and highly toxic materials, under OSHA 29 CFR 1910.1200 Appendix A. Personnel using cyanide must be trained in the health hazards, personal protective measures and emergency procedures.

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Health Effects:

Cyanide can cause adverse health effects when inhaled or absorbed through the skin. Hydrogen cyanide is a colorless gas with a faint, bitter, almond like odor, while sodium cyanide and potassium cyanide are both white solids. Cyanide compounds are used in many industrial applications but their use in academic research laboratories is usually on a small scale.

Cyanide is a fast acting poison, which when exposed to can cause severe breathing difficulty, convulsions and/or death. Low level exposure may result in shortness of breath, convulsions, and loss of consciousness. Exposure to cyanide at, high levels for a short period may result in irritation of the eyes, nose and throat; headache, shortness of breath, harm to the central nervous system, the respiratory system, the cardiovascular system, and may quickly lead to death. Long-term exposure to low levels of cyanide may cause deafness, vision problems, nosebleed and loss of muscle coordination. It may also affect the thyroid gland. Cyanide is stored and used in several laboratories at Columbia University. While engineering controls and Personal Protective Equipment must be utilized when working with cyanide, the possibility for accidental exposure exists. Personnel using these materials are required to exercise extreme caution and follow these guidelines when working with any cyanide, particularly; hydrogen cyanide, potassium cyanide and sodium cyanide. Other cyanide salts may require similar precautions.

E. Procedures

1. Purchasing:

- a. Purchase the smallest amount of cyanide needed for a specific task.
- b. Notify the office of Environmental Health & Safety (EH&S) that the lab is intending to use cyanide or a cyanide containing compounds.
- c. Maintain the Safety Data Sheet (SDS) in the laboratory where cyanide is used.

2. Storage:

- a. Label all cyanide chemicals clearly.
- b. Store in tightly closed containers, in a secured and well-ventilated area away from water, moisture and steam.
- c. Cyanide must be stored separately from incompatible materials such as strong acids including hydrochloric, sulfuric and nitric acid and acid salts.
- d. Cyanide compounds are not compatible with oxidizing agents (such as perchlorates, peroxides, permanganates, chlorates, nitrates, chlorine, bromine, and fluorine); amines; calcium hydroxide; caustic ammonia; sodium carbonate; iron and magnesium. These must be stored away from cyanide.
- e. The SDS along with the Standard Operating Procedures (SOP) should be available in the laboratory where this material is being stored and used.

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3. Handling & Use:

- a. Ensure all lab staff members who will be working with and storing cyanide have taken the appropriate safety training: Laboratory Safety Training (TC0950) and Cyanide Safety Training (TC0085)
- b. Review the SDS and Standard Operating Procedures, as well as these guidelines before any work with cyanide begins.
- c. All work with cyanide must be performed within a certified chemical fume hood.
- d. Personnel should not work alone while using cyanide; limit work to normal business hours.

4. Personal Protective Equipment

- a. Personal Protective Equipment (PPE) must be worn when working with cyanide. This includes safety goggles, nitrile gloves and lab coats.

5. Disposal:

- a. Contact EH&S to establish appropriate waste stream prior to use
- b. Waste materials should be kept in a closed and properly labeled container within a certified fume hood or Satellite Accumulation Area (SAA) within the laboratory.
- c. Cyanide waste should be collected independently of other waste types. To avoid any potentially hazardous reactions
- d. All gloves, matting, and any other potentially contaminated material must also be collected and labeled as hazardous waste.
- e. Please note that cyanide is an Environmental Protection Agency (EPA) P-Listed (acutely toxic) material and the bottle it was received in, even when empty, must also be managed and collected as hazardous waste.
- f. For hazardous waste disposal services please complete the waste pick-up request form at <http://vesta.cumc.columbia.edu/ehs/wastepickup/>.

F. Emergency Contacts

1. Emergency Preparedness

- a. Consider safety and emergency procedures when planning work with cyanide compounds and writing SOP's
- b. Before performing any work, researchers should become familiar with the location and use of all safety equipment in the laboratory. This includes eye wash stations, emergency showers and fire extinguishers.
- c. Eye wash stations must be regularly tested to insure proper function
- d. Never work alone with cyanide compounds
- e. Copies of the SDS must be readily available in the laboratory in case of an exposure related medical emergency

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- f. Cyanide users must be familiar with emergency contact information prior to performing any work

2. Contact Information:

Campus	Hours	Faculty / Staff	Students	Public Safety Contact
CUMC	Business-Hours	Workforce Health & Safety- Harkness Pavilion First Floor (212) 305-7580	Student Health Services - 60 Haven Avenue (212) 305-3400	x305-7979
	After-Hours	NYPH Emergency Department - First Floor of the Vanderbilt Clinic (VC)	NYPH Emergency Department - First Floor of the Vanderbilt Clinic (VC)	
LDEO	Business-Hours	Nyack Hospital: 160 North Midland Avenue Nyack, NY 10960 (845) 348-2000		(845) 359-2900 or x555
	After-Hours			
Morningside	Business-Hours	St. Luke's Hospital 1111 Amsterdam Avenue at 114th St, New York	Student Health Services - John Jay Hall, 3rd and 4th Floors (212) 854-2284	x99
	After-Hours		St. Luke's Hospital 1111 Amsterdam Avenue at 114th St, New York	
Nevis	Business-Hours	St. John's Riverside Hospital Dobbs Ferry Pavilion 128 Ashford Avenue Dobbs Ferry, NY 10522 (914) 693-0700		(914) 591-2870
	After-Hours			

- Exposure to cyanide is a serious medical emergency and onset of symptoms after cyanide exposure is very rapid. If an exposure results in cyanide contact with the eye, or irritation of the eye, nose, and throat, symptoms may include: Shortness of breath or other respiratory symptoms or chest pain, confusion, headache, weakness and loss of consciousness.
- In case of emergency: contact public safety at:
 - Morningside 212-305-5555
 - Medical Center 212-305-7979
 - LDEO 845-359-2900 or extension 555
 - Nevis 914-591-2870 or EH&S 212-854-8749
- A person exhibiting severe symptoms should be kept calm until help arrives. CU Public safety and EH&S should be called immediately.
- The affected person should be removed to a fresh air; all co-workers in the lab should evacuate the area; and all lab doors should be closed. CU Public safety and EH&S should be called immediately.
- In case of skin contamination, remove contaminated clothing & wash the affected area with water for 15 minutes and seek medical help as soon as possible.
- Make SDS & SOP available to rescuers and the medical personnel upon their arrival.

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G. Cross References like URL, Forms, web addresses, etc.

N/A

H. Medical Surveillance

N/A

I. Recordkeeping:

It is recommended that records of cyanide use and inventory be maintained.

J. Appendices

K. Forms

In case of an exposure, please complete the Departmental Accident Report Form
http://hr.columbia.edu/sites/default/files/document-files/2014/09/08/departement_accident_report.pdf

L. References

1. Centers for Disease Control and Prevention (CDC)
<http://emergency.cdc.gov/agent/cyanide/index.asp>
2. US Environmental Protection Agency (EPA), Toxicological Review of Hydrogen Cyanide and Cyanide Salts, September 2010
3. Occupational Safety & Health Administration (OSHA)
<https://www.osha.gov/dts/sltc/methods/validated/1015/1015.pdf>
<http://www.cdc.gov/niosh/docs/81-123/pdfs/0333.pdf>