

Hazardous Materials in Schools/Chemical Hygiene Plan

Hazardous materials include any substance or mixture of substances posing fire, explosive, reactive, or health hazards including a number of science laboratory chemicals and supplies, common school cleaning materials, spray oven cleaners, cleaning solvents, photo chemicals, soldering flux, some ceramic glazes, oils, and gasoline.

The Superintendent of Schools shall develop regulations to minimize the use of these materials in the schools, including substituting, when possible, non-hazardous materials for hazardous materials and through minimizing amounts of hazardous material used and stored in the schools.

To the extent hazardous materials are necessary in educational programs or in school building maintenance, the Superintendent of Schools shall develop regulations and practices on:

1. identification and labeling of hazardous materials;
2. use of hazardous materials;
3. storage of hazardous materials;
4. transportation of hazardous materials;
5. disposal of hazardous materials;
6. maintenance of material safety sheets in the building principal's office;
7. chemical hygiene plans shall be maintained at all schools that have a science laboratory; and
8. training of appropriate staff in procedures and practices enumerated in 1-7 above.

Procedures must comply with applicable local, state, and federal laws and regulations pertaining to safe and proper use, storage, transportation, and disposal of hazardous materials.

Chemical Hygiene Policy Statement for High School Laboratories

Public and private schools over the past few years have had to comply with various Hazard Communication or "Right to Know" laws. In 1990, the Occupational Safety and Health Administration (OSHA) instituted "The Laboratory Standard"—Occupational Exposure to Hazardous Chemicals in Laboratories. This new "Laboratory Standard" has been designed to address the specific safety needs of the laboratory.

The Laboratory Standard ensures that employees who work in a laboratory setting will be protected from any chemical exposure that exceeds permissible exposure limits and that employees be educated as to the hazardous nature of the chemicals they use in the laboratory. To achieve this goal, the Laboratory Standard **requires** the school district to appoint a chemical hygiene officer to develop, implement, and monitor a chemical hygiene plan.

Hazardous Materials in Schools/Chemical Hygiene Plan, continued***School District Responsibilities***

The school board and the school district superintendent have ultimate responsibility to ensure the institution complies with the Laboratory Standard. Several of these tasks are:

- 1) Record all employee exposures to hazardous chemicals.
 - a) Record all chemical exposures and use monitoring instruments to get hard data*. Obtain and keep up to date information provided by a medical examination.
 - b) Keep these records and allow employee access to these records, including all employee exposure and medical records.
 - * Do not get alarmed. This provision is included in the Lab Standard, but clearly states you only have to monitor exposure levels if you know you routinely have an exposure level which is above the permissible exposure level (PEL) and an OSHA Standard exists for the chemical which requires monitoring. If you have no reason to believe you have exceeded a PEL, you do not have to monitor exposure levels.
- 2) Train employees to:
 - a) Understand the hazards of chemicals they use in the laboratory.
 - b) Recognize signs and symptoms associated with overexposure to hazardous chemicals.
 - c) Properly use personal protective equipment (fume hoods, respirators, goggles, etc.)
 - d) Protect them from chemical exposure by following good laboratory procedures.
 - e) Understand the content of the Chemical Hygiene Plan.
- 3) Provide access to all employees of
 - a) MSDS (Material Safety Data Sheets).
 - b) Previous exposure records (if any).
 - c) Previous medical records (if any).
 - d) The Laboratory Standard and Chemical Hygiene Plan.
 - e) Permissible exposure limits of hazardous chemicals used in the laboratory. (Consult your Flinn Chemical Catalog/Reference Manual)

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- 4) Upon receipt of chemical.
 - a) Make sure you have the MSDS (and make them accessible to the employee).
 - b) Make sure the label is proper and contains the minimum amount of information.
 - 1) Chemical name.
 - 2) Hazard information.
 - 3) Name and address of the manufacturer.

Note: You must follow these steps for all chemicals and chemical solutions made and stored in your laboratory or chemical storeroom.

The Chemical Hygiene Plan—An Overview

The Chemical Hygiene Plan is the major ingredient of the Laboratory Standard. Our school district should develop and carry out a written Chemical Hygiene Plan that is capable of:

- 1) Protecting employees from health hazards associated with hazardous chemicals in the laboratory.
- 2) Keeping chemical exposures below established permissible exposure limits. (Consult a Chemical Catalog/Reference Manual for specific chemical permissible exposure limits.)

The Chemical Hygiene Plan must be readily available to employees. The school district shall review and evaluate the effectiveness of the Chemical Hygiene Plan at least annually and update it as necessary. The Chemical Hygiene Plan should include each of the following elements and should include specific measures the employer will take to ensure laboratory employee protection.

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- G) Chemical Storage Rules and Procedures.
 - 1) Compressed Gas Handling Instructions.
 - 2) Flammable Chemical Handling Instructions.
 - 3) Corrosive Material Handling Instructions.
- H) Procedure—Specific Safety Rules and Guidelines (Including Severely Toxic and Carcinogenic Substances).
- I) Prior Approval Required Procedures
- J) Safety Equipment Inspection (every 3 months—minimum)

II. Employee Training.

III. Exposure Evaluations.

IV. Medical Evaluations.

V. Monitoring

VI. Emergency Evacuation Plan.

VII. Reprint of The Laboratory Standard.

Chemical Hygiene Plan

I. Standard Operating Procedures

A) General Employee Rules and Procedures

- 1) Minimize all chemical exposures.
- 2) Skin contact with chemicals should be avoided.
- 3) Avoid underestimation of chemical hazards and risks.
- 4) Develop a firm goggle policy. Wear appropriate eye protection at all times. Chemical splash goggles must be worn any time chemicals, glassware or heat are used in the laboratory.
- 5) Never work alone in the laboratory, chemical storage or prep areas.
- 6) Flammable liquids require special attention. Never use these materials near any source of ignition, spark, or open flame.
- 7) Never perform a first-time chemical demonstration in front of your class. Always perform first-time demonstrations in front of other instructors to evaluate the safety of the demonstration.

Hazardous Materials in Schools/Chemical Hygiene Plan, continued

- 8) Never store chemicals over, under, or near a sink.
- 9) Only authorized personnel should be allowed in the chemical storeroom.
- 10) Have a fire blanket easily accessible in case of an accident.
- 11) Train all students on how to use all safety devices in the laboratory (e.g., eyewash, fire extinguisher, etc.) and teach all students and employees to find the safety devices quickly in an emergency.
- 12) Know appropriate procedure in the event of a power failure.
- 13) Know where and how to use master utility controls to shut off gas, electrical and water supplies.
- 14) Do not smell or taste chemicals.
- 15) Use a safety shield whenever an explosion or implosion might occur.
- 16) Read all chemical labels prior to use.
- 17) Know and understand the hazards of the chemical as stated in the MSDS and other references.
- 18) Use protective safety equipment to reduce potential exposure, i.e. gloves, respirators, fume hood, etc.
- 19) Know the locations for all personal safety and emergency equipment, eyewash, shower, fire extinguisher and spill control materials.
- 20) Know how to properly store all chemicals in their compatible chemical families. (Consult the Flinn Chemical Catalog/Reference Manual for details.)
- 21) Know proper transportation and disposal procedures for chemicals.
- 22) Know appropriate emergency procedures, waste disposal, spill clean up, evacuation routes and fire emergency notification.
- 23) Know and understand the personal hygiene practices outlined in the Chemical Hygiene Plan.
- 24) Know the proper procedure for reporting accidents in the laboratory.

B) General Laboratory Rules and Procedures

- 1) Create a written first aid policy; whether it says to treat, contact school nurse or call a physician. Your first aid policy must be written down.
- 2) The laboratory should be well ventilated. (a ventilation fan that can remove the air a minimum of 8 air changes per hour) Air for laboratory ventilation shall directly flow into the laboratory from non-laboratory areas and out to the exterior of the building. Ventilation must be checked a minimum of every 3 months.

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- 3) Post emergency telephone numbers in the chemical stores area. Have a telephone or some means of emergency communication in the laboratory, chemical storage area and prep area.
- 4) Do not use chipped, etched, or cracked glassware. Glassware, which is chipped or scratched, presents a serious breakage hazard when heated or handled.
- 5) All laboratories must have an eyewash capable of treating both eyes continuously for 15 minutes with copious quantities of tepid water. Teach everyone how to use the eyewash quickly in case of an emergency. Eyewash effectiveness and operation should be inspected every week. Promptly repair any eyewash that does not meet the water flow requirements of ANSI Z358.1.
- 6) In the event of an accident, when time allows, fill out an accident report describing the event in detail.
- 7) Read all labels carefully—the names of many chemicals look alike at first glance.
- 8) Do not operate electrical equipment with wet hands.
- 9) Have appropriate types and sizes of fire extinguishers. Tri-class ABC and Halon fire extinguishers are appropriate for laboratories. Carbon Dioxide fire extinguishers are inappropriate for laboratories. A Class D fire extinguisher should be available when working with flammable solids. Fire extinguishers should be inspected every six months.
- 10) Do not block fire exits.
- 11) Have an alternative evacuation route in the event your primary route becomes blocked.
- 12) Practice your emergency plans.
- 13) Do not drink from lab glassware or other lab vessels.
- 14) No food in the laboratory. Do not eat, drink, or chew gum in the laboratory.
- 15) Do not apply cosmetics in areas where laboratory chemicals are present.
- 16) Keep all aisles clear.
- 17) Do not run in the laboratory.
- 18) No unlabeled products should be stored anywhere in the science facility.
- 19) Be thoroughly familiar with the hazards and precautions for protection before using any chemical. Study the precautionary label and review its contents before using any chemical substance.
- 20) An approved eyewash station and fire blanket should be within 25 feet of the chemical stores area.

Hazardous Materials in Schools/Chemical Hygiene Plan, continued

- 21) Neutralizing chemicals, such as a spill kit, dry sand, kitty litter, and other spill control materials should be readily available.
- 22) Dispose of all chemicals properly. All disposal procedures used should conform to state and local regulations.
- 23) Safety showers or body drenches should be provided. Showers should be tested every six months. Promptly repair any shower or body drench that does not meet the water flow requirements of ANSI Z358.1.
- 24) Access to exits, emergency equipment, and master utility controls should never be blocked.
- 25) All accidents or near accidents (close calls) should be carefully analyzed with the results distributed to all who might benefit.
- 26) Never pipet by mouth.
- 27) Avoid the use of contact lenses in the laboratory. If contact lenses must be worn, the science teacher must be informed so special precautions can be taken.
- 28) Never perform unauthorized laboratory experiments.

C) Personal Hygiene Guidelines

- 1) Do not apply cosmetics or smoke, eat, chew, or drink in the laboratory.
- 2) Do not pipet by mouth—always use a pipet bulb or other appropriate suction device.
- 3) Wash thoroughly after any chemical exposure or before leaving the laboratory.
- 4) Never smell chemicals directly; always waft the odors to your nose using your hand.
- 5) Never bring foodstuffs, opened or closed, into the lab, chemical prep, or storage area. Foodstuffs, should not be eaten if in a room with toxic materials.

D) Protective Clothing Requirements

- 1) Eye protection must be worn. Chemical splash goggles must meet ANSI Z87.1 Standard. Wear face shields when dealing with corrosive liquids, (i.e., full strength acids and bases).
- 2) Wear gloves that offer protection for all hazards you may find in the lab. Test for holes every time you wear your gloves.
- 3) Always wear a full-length lab coat or a chemical-resistant apron.
- 4) Wear low-heeled shoes. Do not wear open-toed shoes or sandals of any kind. Always wear socks in the laboratory.

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- 5) Wear a respirator with the appropriate cartridge if you feel you might exceed permissible exposure limits as specified in the MSDS.
- 6) Never block access to emergency exits or equipment.
- 7) Clean up all spills properly and promptly.
- 8) Do not wear shorts—wear long pants
- 9) Do not wear loose or balloon sleeves.
- 10) Tie back long hair.
- 11) Do not wear contact lenses—goggles fit over eyeglasses.
- 12) Do not wear hanging jewelry.
- 13) Do not wear a long or loose necktie.
- 14) Do not wear an absorbent watchstrap.
- 15) Inspect all protective safety equipment before use. If defective, do not use.

E) Housekeeping Rules

- 1) Keep chemicals in the chemical prep and storage area. If chemicals are moved to the classroom for lab, they must be returned to their proper storage location at the end of the day's laboratory periods.
- 2) Waste materials require proper containers and labels.
- 3) Do not store items in the fume hood. The storage of items in the fume hood is a fire hazard and decreases the efficiency of the fume hood.
- 4) Label all chemicals with names and hazards, even solutions.
- 5) Never block access to exits or emergency equipment.
- 6) Clean up all spills properly and promptly.
- 7) Work and floor surfaces should be cleaned regularly and kept free of clutter.

F) Spill and Accident Procedures

- 1) Notify—Call for help. Evacuate—Get everyone to a safe location. Assemble—Organize the students and all workers. Report—Fill out a detailed accident report after the emergency is over.
- 2) Clean up spills immediately and thoroughly. Follow approved spill cleanup procedures, spills should only be cleaned up by approved personnel.
- 3) A bucket of dry sand should be available as a Class D fire extinguisher and to aid in providing traction on a slippery floor.
- 4) Neutralizer for both acid and base spills should be available in the event of a chemical spill.

Hazardous Materials in Schools/Chemical Hygiene Plan, continued**G) Chemical Storage Rules and Procedures**

- 1) Keep an updated inventory of all chemicals, their amounts and location. Stored chemicals should be examined annually for replacement, deterioration, and chemical integrity. Your entire Chemical Hygiene Plan is based on the proper updated inventory always being available.
- 2) Label all chemical solutions you make with the identity of the contents, date, concentration, hazard information, and your name.
- 3) Date label all chemicals with the purchase date. This will allow anyone to determine the age of a substance at a later date.
- 4) Establish a separate and secure storage area for chemicals.
- 5) Do not allow incoming shipments of chemicals to be opened and transported by school personnel other than qualified science teachers. The special and expensive shipping containers used are frequently discarded and would prove valuable for chemical storage.
- 6) All chemicals should be stored in chemically compatible families (See Flinn Chemical Catalog/Reference Manual for details)
- 7) Store the minimum amount of chemicals needed.
- 8) Store corrosives in appropriate corrosives cabinets.
- 9) No flammable materials should be stored outside an approved flammables storage cabinet unless in safety cans.
- 10) Do not store chemicals under a fume hood.
- 11) If possible, keep certain items in the original shipping package, e.g., acids and bases in the special and expensive Styrofoam cubes.
- 12) Avoid storing chemicals on shelves above eye level.
- 13) The storage area and cabinets should be labeled as to identify the hazardous nature of the products stored within. This will allow fire department officials to quickly see a potentially hazardous area.
- 14) Shelving above any work area, such as a sink, should be free of chemicals or other loose miscellany.
- 15) Shelving sections should be secured to walls or floor to prevent tipping of entire sections.
- 16) Shelves should be equipped with lips to prevent containers from rolling off.
- 17) Chemicals should not be stored on the floor except in approved shipping containers.

Hazardous Materials in Schools/Chemical Hygiene Plan, continued

- 18) Storage area should be ventilated by at least four changes of air per hour. Isolate the chemical storage exhaust from the general building ventilation system.
- 19) Never store food in a laboratory refrigerator.
- 20) Store chemicals in a separate, locked, dedicated storeroom.
- 21) Store all poisons in a locked cabinet.
- 22) Only authorized personnel are allowed in the chemical storage area. Students should never be allowed in this area.
- 23) Chemical exposure to heat or direct sunlight should be avoided.

Storage Requirements—Compressed Gas Handling Instructions

- 1) Compressed gases should be handled as high-energy sources, and therefore, as potential explosives.
- 2) Always protect the cylinder valve stem.
- 3) Avoid exposure of cylinders to heat. Do not store gas cylinders in direct sunlight.
- 4) Never lubricate, modify, force, or tamper with a cylinder valve.
- 5) Cylinders of toxic, flammable, or reactive gases should be used only under a fume hood.
- 6) Do not extinguish a flame involving a combustible gas until the gas is shut off—otherwise it can reignite—possibly causing an explosion.
- 7) Gas cylinders must be secured in place. They must be protected to prevent valve damage that may be caused by falling.

Storage Requirements—Flammable Chemicals Handling Instructions

- 1) Store all flammables in a dedicated flammables cabinet.
- 2) Keep cool, between 55°F and 80°F, at all times.
- 3) Store away from all sources of ignition.
- 4) Store away from all oxidizers.
- 5) Never store flammables in refrigerators unless the refrigerator is explosion proof.
- 6) Avoid storing any chemicals, especially flammable materials in direct sunlight.

Hazardous Materials in Schools/Chemical Hygiene Plan, continued**Storage Requirements—Corrosive Materials Handling Instructions**

1. Store corrosives in appropriate corrosives cabinets.
2. If possible, keep certain items in the original shipping package, e.g., acids and bases in the special and expensive Styrofoam cubes.
3. Working with corrosive materials requires special eyewear. Wear a chemical splash faceshield when handling corrosive materials.
4. At least every three months inspect all shelf clips in your acid cabinet to check for possible corrosion. These shelf clips are the only thing between you and a collapsed shelf. They require special attention.

**H) Procedure Specific Safety Rules and Guidelines
(for extremely hazardous chemicals)**

- 1) Use a fume hood when the permissible exposure limit for a chemical is less than 50 ppm as indicated on the chemical MSDS.
- 2) Use carcinogens, mutagens, teratogens, and allergens only under a fume hood.
- 3) Handle toxic, corrosive, flammable, and noxious chemicals under a fume hood.
- 4) Do not expose flammable liquids to open flame, sparks, heat, or any source of ignition.
- 5) Only use flammable solids (sodium, potassium, lithium, etc.) in very small quantities. Use a safety shield when igniting flammable solids.
- 6) Water-reactive solids (sodium metal, potassium metal, etc.) should be stored under dry oil.
- 7) Use extreme caution when handling finely divided (dust-like) material. Finely divided materials may form explosive mixtures with air.
- 8) Open cans of ether (ethyl ether) should be properly disposed of after use and not stored unless absolutely necessary. Rely on expiration date to dispose of the material.
- 9) Glycerin should be available only to the instructor.

I) Prior Approval Procedures

There may be some procedures which require prior approval before an instructor attempts to perform them. These procedures must be determined by cooperation and communication between the Science Department and the Chemical Hygiene Officer.

Hazardous Materials in Schools/Chemical Hygiene Plan, continued**J) Safety Equipment Inspection**

There are many safety items necessary for compliance to the Laboratory Standard. They include, but are not limited to:

- 1) Eyewashes.
- 2) Fire extinguishers.
- 3) Goggles.
- 4) Respirators.

One of the most important sections of the Laboratory Standard states that all safety equipment in the facility must always be in good operating condition. While the Laboratory Standard requires some safety equipment and highly recommends other equipment, the standard is very clear on the point that if you have a piece of safety equipment, it must be functional at all times. This statement applies to all safety equipment, required or recommended.

- 1) Goggles always must be clean and functional.
- 2) Laboratory ventilation must meet the standard of eight air changes per hour and must be tested quarterly.
- 3) A respirator must be fit tested and the appropriate cartridges must be available.
- 4) Fire extinguishers must be of the right type, Tri-class ABC, and they must always be properly inspected.
- 5) Eyewashes must be functional and flushed at least once a week.
- 6) Fume hoods must be operational at the level of 70-100 linear feet per minute as measured by a velometer.

All of the above items and all safety equipment must be inspected every three months at the minimum. Any safety equipment failing this quarterly inspection or reported to be out of order at any time must be repaired immediately. Any safety equipment found to be out of order is a serious violation of the Laboratory Standard.

II. Employee Training

Waterbury Public Schools provides ongoing training sessions for our employees. Our training includes:

- 1) Content and location of this Chemical Hygiene Plan and The Laboratory Standard.
- 2) Potential hazards involved in using chemicals.
- 3) Signs and symptoms of overexposure to chemicals. How to detect potentially harmful exposures before they are harmful.
- 4) Location and availability of chemical Material Safety Data Sheets (MSDS).
- 5) Understanding of the permissible exposure limits (PELs) used in the school.
- 6) The proper use and location of all safety equipment.

Hazardous Materials in Schools/Chemical Hygiene Plan, continued**III. Exposure Evaluation**

It is the communicated policy of Waterbury Public Schools to investigate all suspected overexposures to chemicals in a prompt and timely fashion.

In the event of an overexposure, after the immediate event, we must document all chemicals and circumstances involved in the overexposure. This information should be used to change safety practices to further improve lab safety. It is our obligation to maintain these files and make them accessible to the employees.

Signs of overexposure are numerous; they include:

- 1) Accidental breakage of a hazardous material container.
- 2) A skin rash or irritation occurring because of contact with a chemical.
- 3) Caustic splash to eyes, face, or body.
- 4) Symptoms such as nausea, dizziness, and others.

If monitoring of the air is determined to be necessary, the results of the monitoring must be made available to the employees within 2 weeks.

IV. Medical Evaluations

It is the policy of Waterbury Public Schools to make medical consultation and examination available to our employees when:

- a) Any sign or symptom of an overexposure to a chemical is present.
- b) Monitoring has indicated an overexposure to a chemical has occurred.
- c) There has been a spill or uncontrolled release of chemical fumes.

We will provide the physician with the names of the chemicals used, circumstances of the exposure and all signs and symptoms of the exposure.

The medical examinations dealing with the overexposure must be documented and other employees working under the same conditions must be notified. All documentation must be kept on file and accessible by other employees working in this area.

All medical examinations and consultations shall be performed by or under the direct supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay.

Hazardous Materials in Schools/Chemical Hygiene Plan, continued

V. Monitoring

Monitoring will be necessary for substances regulated by a standard only if there is reason to believe that exposure levels for that substance routinely exceed the PEL for that substance. If you have no cause to suspect a hazard or an exposure, no monitoring is necessary.

If monitoring is performed and this initial monitoring shows no evidence of exposure, the monitoring may be discontinued. If initial monitoring indicates an exposure, steps must be taken immediately to reduce the exposure to permissible limits. Monitoring must then be performed periodically to verify that the steps to reduce the exposure have been effective. Monitoring may be terminated after complying with the applicable standard for the hazardous material. All monitoring results and activities shall be fully accessible and in full knowledge of the employee(s).

VI. Emergency Evacuation Plan

Establish a chain of communication. John tells Sally, Sally tells Bill, Bill notifies the office, the office notifies the fire department, etc. Remember, notify before proceeding to handle the incident. It is often better to notify someone else than to proceed in addressing the problem at hand by yourself.

Evacuation may or may not be necessary depending on the incident. Once it has been determined evacuation is necessary, proceed in an orderly fashion as you would in a fire drill evacuation. Send everyone to a pre-designated area and then count heads to make sure everyone is out of the building.

Proper evacuation procedures must be thoroughly planned, detailed in writing, and properly communicated in advance. In case of an emergency, you will not have time to determine "What do I do next?". This evacuation plan will be part of the Chemical Hygiene Plan.

_____ (School Name) Emergency Evacuation Plan
Inserted here

Legal Reference: Connecticut General Statutes
19a-332 through 19a-332d re carcinogenic substances and
asbestos abatement.

Policy adopted by the Waterbury Board of Education on October 4, 2012