

Brandeis University

Griffith Laboratory

Shapiro Science Center

Rm 2-06

BRANDEIS LABORATORY SAFETY MANUAL



Dept of Environmental Health & Safety

Injured at Work Quick Sheet

- Ensure you and those around you are safe
 - Call Public Safety (781-736-3333) for first aid, help, or there are other hazards
 - Call Occupational Health (781-736-8769) with questions or for additional support
- Notify your supervisor
- Get checked out - please contact your primary care provider or be evaluated by a local urgent care or emergency room
- Complete the accident/injury report. Please use this link below to create an accident/injury report: go.brandeis.edu/accident or Scan QR code to access report:



Brandeis Contacts

Public Safety Emergency: (781)736-3333

Public Safety Non-Emergency: (781)736-5000

Occupational Health: Suzanne Raj, occhealth@brandeis.edu, (781)736-8769

Worker's Compensation: Renee Relford, renerelford@brandeis.edu, (781)736-4451

Environmental Health & Safety: Andrew Finn, afinn@brandeis.edu, (781) 736-4262

Facilities: Monday-Friday 7 AM- 4:30 PM (781)736-8500, Weekends, Holidays and After Hours (781)736-5000

Local Urgent Care

AFC Urgent Care Waltham: 1030 Main St. (781) 894-6900
Monday - Sunday: 8:00 AM - 8:00 PM

Newton-Wellesley Hospital Waltham Walk-In: 9 Hope Ave. (617) 243-5590
Mondays - Friday: 10 AM - 6 PM, Saturday 9 AM - 5 PM, Sunday: CLOSED

PhysicianOne Urgent Care Waltham: 1019 Trapelo Rd. (800) 650-3848
Monday - Friday: 8 AM - 8 PM, Weekends and Holidays: 9 AM- 5 PM

Emergency Rooms

Newton-Wellesley Hospital- Main Campus: 2014 Washington St. Newton, MA 02462 - (617) 243-6193.

Poisoning or Chemical Exposure Hotline: 1-800-222-1222

Blood Borne Pathogen Exposure: Wash exposed and seek medical evaluation immediately.

LABORATORY SAFETY MANUAL

1. CHEMICAL DISCHARGE SUMMARY
2. CHEMICAL HYGIENE PLAN
3. SAFETY GUIDELINES
 - a. COMPRESSED GAS
 - b. CORROSIVE CHEMICALS
 - c. CRYOGENIC MATERIAL
 - d. ETHIDIUM BROMIDE
 - e. FLAMMABLE AND COMBUSTIBLE LIQUIDS
 - f. GLASSWARE
 - g. LACHRYMATORS (EYE IRRITANTS)
 - h. OXIDIZING CHEMICALS
 - i. CHEMICAL STORAGE
4. DRY ICE SHIPMENTS
5. HAZARD IDENTIFICATION
6. TRAINING LOG

Chemical Hygiene
Plan

Guidelines

Shipping

Chemical Hygiene Plan

Calculations

Shipping

**SUMMARY OF BRANDEIS REQUEST TO DISCHARGE VARIOUS CHEMICALS INTO THE MASS WATER RESOURCES AUTHORITY
SEWER SYSTEM (June 2011)[i.e. sink disposal]**

Contact EH&S for questions regarding this table (afinn@brandeis.edu)

Material	Details	Allowable Discharge	Prohibited
Water/methanol	90% water, 10% methanol solution	Approved for discharge at this strength.	
Ethidium bromide soln.	>98% water, acetic acid, Ethidium bromide >10 ug/ml (discharge after filtration?)		Prohibited
Ethidium bromide soln.	>98% water, acetic acid, Ethidium bromide <10 ug/ml (discharge after filtration?)		Prohibited
Agarose solutions	Water, agar	Approved as long as discharge will not cause an obstruction	
Water/ethanol	~80% water, ~18-20% ethanol, trace % salts & glycine	Approved for discharge at this strength.	
LB Media	>98-99% water, <1% ethanol and/or methanol, mixed antibiotics (Ex: Gentamicin 30 mg/ml; Chloramphenicol 30 mg/ml; Ampicillin 100 mg/ml; Kanamycin, Tetracycline)	Discharge of antibiotics and/or endocrine disruptors discouraged. Minimize concentration and/or volume. Make substitutions if possible.	
DTT (Dithiothreitol) & Water	>98-99% water, <1% Dithiothreitol (Celand's Reagent)	Approved for discharge at this strength.	
AZT (Azidothymidine) & Water	>98% water, trace amounts of AZT 10ng/ml solution, trace salts, sugars and proteins	Discharge of antibiotics and/or endocrine disruptors discouraged. Minimize concentration and/or volume. Make substitutions if possible.	
Hydroxyurea & Water	>99% water, <1% Hydroxyurea	Discharge of medicines discouraged. Minimize concentration and/or volume. Make substitutions if possible.	
IPTG Solution & Water	>98-99% water, <1% Isopropyl-β-D-thiogalactopyranoside (~several liters/day during use)	Approved for discharge at this strength.	
EDTA & Water	>98-99% water, <1% Ethylene diamine tetraacetic acid (~several liters/day during use)	Approved for discharge at this strength.	
PCR Purification Kit Solution (Qiagen)	Buffer & extraction solution containing <5% of the following: Guanidinium chloride, Propan-2-ol, Guanidinium thiocyanate, Sodium perchlorate	Approved for discharge at this strength.	
Gel Purification Kit Solution (Qiagen)	Buffer & extraction solution containing <5% of the following: Guanidinium chloride, Acetic acid, Sodium dodecyl sulphate, Sodium hydroxide, Propan-2-ol, Edetic acid	Approved for discharge at this strength.	

2pm Lab Safety Mtg
Lab Safety Co-ordinators

7/18/2012

Chem hygiene plan in binder
Check EH+Safety web site for updates

Add Lab specific safety procedures to this book
Dry Ice training - must do to ship on dry ice

- Do lab hazard evaluation - 1x/year
 - where is last one?
 - go over with lab - use sign in sheet to document

- Triumverate - yearly lab audit/evaluation
- Tell lab I will co-ordinate with Andy
- Check cork board for meetings/trainings
- First Aid supplies in hall

- Sm syringes in sharps or glass box - NOT trash
large (50-60 ml) in trash bag

Activated Charcoal filter for EtBr gel soln/buffer

62561
waste pickup ⁶²⁵⁶¹ for pickup

3/23/2012

Rosenfeld 332

1 Chem Safety - Andy Finn
2 Rosenfeld 118 (R118)

BU
Campus Operations
Dept of Environ
Health & Safety

Triumvate

no req. to have waste area in hood
must be accessible, out & visible, check weekly
must be at/near where waste is generated
caution tape - make it identifiable - must define area
as haz. waste area

get more 2nd any containers from Andy

Inspect area weekly - must be 2012 calendar
Brandis/

→ weekly inspection form - calendar, check weekly
X out date on calendar get 2012 calendar

✓ → M, Th pick ups

let Triumvate date the label when they come
to pick up waste

• confirm with Triumvate
email for needed containers

chemicals ≥ 1 foot from sink

Haz waste - Andy's budget
not direct from lab budget

10/25/06
p. 19 of 2000

Hazardous Waste - Satellite Accumulation Area

- fume hood SSC 2-06

- Suggestions from NADINE
(Triumvirate)

is combining waste containers
Combining

Dry Waste

Keep Separate

TTX (41%)?

Phenol Chloroform

all
Others - can
combine

Liq { EtBr
Dimethyl Formamide
Paraformamide
Acrylamide

Keep
Separate Liq:

Triethylamine - corrosive

Acetone } flammable
Methanol }

any other
flammables

4/4/11 NADINE - Env
Triumvirate

Chemical Hygiene
Plan

Guidelines

Shipping

Andy

Lab Safety Assessment

~~Triclinic~~ Triclinic Reps with Lab Safety Coord. -

Walk-through one quarter during the year
(see schedule)

- work in progress -

9/28/11 Tyler from Triconvitate EH&S
did lab survey

- 1- glass waste in "official" boxes - ~~checked~~ ^{heavy cardboard is ok} - Andy
- 2- sharps (blades, needles) separate from broken glass (sharps - special containers - turn in to Hg. L. for disposal)
[they get autoclaved, then burned]
- 3- open needles on CO₂ tubing - keep covered!
- 4- needles on water bottles - also keep covered
- 5- update chem inventory

3- open needles on CO_2 tubing - keep covered!

4- needles on water bottles - also keep covered

5- update chem inventory

Chemical hygiene Plan

Covidalings

Shipping

Brandeis Lab Safety Assessment Sheet

Date: 9/28/2011

Building/Room/PI: SSC 2-06

Baronette Griffin



Inspection	Questions	Answer	Comments
	1. Are cylinders secure and segregated correctly?	☒ Y / ☐ N	
	2. Sufficient aisle spacing, egress clear, floor free from trip/slip hazards?	☒ Y / ☐ N	
	3. Fire extinguishers easily accessible, not blocked?	☒ Y / ☐ N	
	4. Does the lab door have proper labeling (hazards, phone numbers)?	☒ Y / ☐ N	
	5. Are chemicals stored >1' away from the sink & hood cupboards (closed, not leaking)?	☒ Y / ☐ N	
	6. Are flammables stored away from ignition sources & protected from open flames?	☒ Y / ☐ N	
	7. Acids & caustics separated and below eye level?	☒ Y / ☐ N	
	8. Broken glass packaged in adequate glass boxes?	☒ Y / ☐ N	open cardboard box, see below
	9. Are the fume hood inspections up-to-date?	☒ Y / ☐ N	
	10. Is equipment/chemicals placed >6" from the front of the hood and is the back bottle not blocked?	☒ Y / ☐ N	
	11. Is chemical inventory posted that is no more than 6 months old?	☒ Y / ☐ N	10/27/2010
	12. FHX surfaces or equipment are protected or signed?	☒ Y / ☐ N	
	13. Lab Safety Manual is available for lab personnel?	☒ Y / ☐ N	
	14. All food and drinks are left outside the lab space?	☒ Y / ☐ N	
	15. All chemical containers including wash (squirter) bottles are labeled?	☒ Y / ☐ N	
	16. All needles/sharps are protected when not in use?	☒ Y / ☐ N	none (none on shelves, no injections)
	17. Is shielding available and in place for potentially pressurized or vacuum operations?	☒ Y / ☐ N	N/A

SCORE: +1 for Yes (Perfect Score = 17)

Pot needs glass disposal boxes and sharps! She has been storing sharps waste in folders containers and then throwing them in a moving box with glass waste. And then leaving the box out for the janitor! Needs to order sharps & glass box

Shipping

Guidelines

Chemical Hygiene Plan

Safety Mtg with Andy 6/10/10
Lab Safety Coordinators - total of 50 (!)

New BINDER - keep in accessible place
 - have everyone initial that they know about it
 (explain at lab mtg)

Back
 Red Section - Guidelines/Policies
 White Section - Dry Ice Guide - only trained people
 \$5,000 penalty if an untrained person does it

Green Tab - lab hazard evaluation sheet
 Toxic - highly - specific handling procedures
 cyanide - tetrodotoxin
 phenol - chloroform - use in hood only
 - can be simple

update Eval. sheet -
 update Redo training log - get new people in log
 maintain list in log book

Incidents
 Acetabrom lab - (42) Methylene Chloride - all in flammable cabinet
 (Koscow) defective bottoms - use 2 hands

Run lab - Defective Biosafety Cab - motor not working - fan not working
 (went back into cab)

Bunsen burner - hot built up in HEPA filter

DONT USE IF NOT WORKING P.D.

Chemical Hygiene Plan

Guidelines

Shipping

Fire Safety

Ed Callahan - Evacuation -

Bldg. Captains - not up-to-date

→ Bldg. Capt - learn overall scheme for evacuations
- disperse info to EVERYONE in the building

SSC "high rise" license - hope to change system
so alarm goes off

H&S website - Fire Evacuation link

print out tri-fold handout

NOTIFY PUBLIC SAFETY 63333 1st - they can reach Andy

never call Waltham Fire Dept. directly - Campus Police can help them.

→ fill in for each lab - 1st box

Evacuation Meeting Space

& Dest. & Transp. Staging Area

} Public Safety Website

SSC - July - fire drill probably.

GRIFFITH LAB

Rec'd 6/10/2010

from Andrew Finn,
Mgr. EH&S

afinn@brandeis.edu

Chemical Hygiene
Plan

Guidelines

Shipping

Checklist



BRANDEIS UNIVERSITY
CHEMICAL HYGIENE PLAN

REVISION UPDATE

Revision: 4/30/08
Issue Date: 4/30/08
Replaces: 2/11/08
Reason: See italics.

Originated by: Andrew J. Finn, Mgr. EH&S
Date: _____

BRANDEIS UNIVERSITY CHEMICAL HYGIENE PLAN

1.0 GENERAL ADMINISTRATION AND RESPONSIBILITIES

The Occupational Safety and Health Administration (OSHA) Lab Standard (29 CFR 1910.1450) is designed to enhance the safety of laboratory personnel through better information and work practices.

The Brandeis University Chemical Hygiene Plan addresses the general hazards of common chemicals and physical hazards that may be present in your laboratory, and describes work practices, procedures and controls which are in place to protect you from those hazards. The professional judgment of Brandeis Faculty and Staff is essential and necessary in the interpretation and application of these procedures, and laboratories may modify or enhance these procedures to meet their specific uses and operational needs. The Environmental Health & Safety Department in coordination with the Laboratory Safety Committee shall assist in establishing additional safety guidelines (Brandeis Safety Operating Guidelines) to assist lab personnel with safe work practices, these guidelines will be made available to all lab personnel.

RESPONSIBILITIES

Each Science Department is responsible for supporting and promoting safe and compliant work practices in the laboratory in accordance with this Plan. Department faculty and administration are responsible for facilitating the implementation of the Chemical Hygiene Plan within each department.

The Vice President for Research shall be the Chemical Hygiene Officer responsible for ensuring that the Department Chairs understand and carry out their responsibilities in this Plan.

The Department Chair for the following departments has the responsibility as the Chemical Hygiene Officer (CHO) for his/her respective department:

- Biochemistry
- Biology
- Chemistry
- Physics
- Psychology

The CHO may delegate responsibilities to an assigned Safety Officer who is qualified to implement the Chemical Hygiene Plan and lab specific hazard procedures in their

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lab(s). It is however the CHO's responsibility to ensure that the Plan is being implemented in his/her lab(s).

The Manager of Environmental Health & Safety shall:

- Maintain the Chemical Hygiene Plan with input from the CHO's and the Lab Safety Committee;
- Periodically audit the implementation of the CHP and lab specific procedures and provide feedback to the CHO and Safety Officer(s).

1.1 GENERAL RULES:

Awareness is the most fundamental rule of Chemical Safety. Everyone should remain constantly aware of:

- Chemicals hazards, as determined from the MSDS (Material Safety Data Sheets) and other appropriate references. MSDSs are available outside the Safety Office in Kalman (down the hall from the Stock Room). Many MSDS are also available through the web for those with internet access:
 - <http://www.promega.com/msds/>
 - <http://www.airgas.com/content/msds.aspx>
 - <https://new.fishersci.com/wps/portal/CMSTATIC?pagename=msds>
 - <http://www.vwrsp.com/search/index.cgi?tmpl=msds>
 - <http://www.msdssearch.com/>
- Appropriate safeguards for using chemicals, including personal protective equipment, use of proper techniques (no mouth pipeting, using chemical carriers, fume hood use).
- How and where to properly store the chemical when not in use and ensuring containers are closed when not in use.
- Proper personal hygiene practices. Always wash hands adequately when leaving a lab.
- The proper methods of transporting chemicals within the facility. Use of chemical carriers or carts.
- The appropriate procedures for emergencies including evacuation routes, spill cleanup procedures and equipment, proper waste disposal and emergency notification (63333).

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Form

nsibilities.

65.

Brandeis Safety Guidelines

Dry Ice Shipping

Hazard Evaluation

Checklist

- G. The practice to Never work alone in a laboratory or chemical storage area when handling highly toxic or reactive materials.
- H. Ensure that you are wearing appropriate eye and skin protection at all times. No open toe or mesh footwear in labs.
- I. When working with flammable chemicals, being certain that there are no sources of ignition near enough to cause a fire or explosion in the event of a vapor release or liquid spill. Similarly, when working with open flames, be certain that there are no flammable chemicals close enough to cause fire or explosion. See also Brandeis Safety Operating Guideline *Flammable and Combustible Liquids Handling*.

1.2 PERSONAL HYGIENE

Personal hygiene is an important factor in chemical hygiene. To reduce exposure, lab personnel must consider and control the four routes of entry to the body, inhalation, injection, ingestion and adsorption to limit the chemical's ability to do harm. Proper personal hygiene practices must be followed.

Proper Personal Hygiene practices include:

- A. Wash promptly whenever a chemical has contacted the skin.
- B. Avoid inhalation of chemicals; DO NOT "SNIFF" to test chemicals.
- C. DO NOT use mouth suction to pipette anything; use suction bulbs or other mechanical means.
- E. DO NOT drink, eat, smoke, or apply cosmetics in chemical areas.
- F. DO NOT store or prepare food, beverages or tobacco products in chemical storage or use areas. Food, drink, and especially tobacco absorb chemical vapors and gases from the air.

1.3 PROTECTIVE CLOTHING AND EQUIPMENT

Personal protective equipment is provided by Brandeis to employees, faculty and students when and where necessary. It is the responsibility of each user to be certain that the appropriate equipment is worn as necessary.

- A. Eye protection worn working with chemicals should meet the requirements of the American National Standards Institute (ANSI) Z87.1. Wear goggles such as type G, H or I at all times. When working with more than 10 mL of a corrosive liquid also wear a face shield, type N, large enough to protect the chin, neck, and ears, as well as the face.

- B. Always wear low-heeled shoes with fully covering "uppers"; DO NOT wear shoes with open toes or with uppers constructed of woven material.

1.4 HOUSEKEEPING

Common housekeeping practices contribute greatly towards chemical hygiene and safety. A clean work area is much safer than a cluttered or dirty one. Some appropriate housekeeping measures include:

- A. Keep all aisles, hallways, and stairs clear of all chemicals, equipment or other obstructions which could cause a trip or fall hazard or otherwise obstruct unimpeded entry and exit.
- B. Keep all work areas and especially workbenches clean of clutter and obstructions. DO NOT use lab hoods as storage areas.
- C. All working surfaces and floors should be cleared regularly.
- D. Access to emergency equipment, showers, eyewashes and exits should never be blocked by anything. Equipment will be inspected on a regular basis. Any defects should be reported to the PI, Facilities or Environmental Health and Safety Office.
- E. Waste must be kept in the proper containers and labeled properly. DO NOT pour waste down laboratory sinks. pH buffer aqueous solutions between 6.0-11.0 SU and containing no other prescribed material may go down lab sinks.
- F. Ensuring that all chemicals are properly closed and stored in a manner that will not pose a health, fire or spill threat (i.e. away from the edge of countertops, away from sinks, away from heat sources, closed unless in use).
- H. All chemical containers must be labeled with both the identity of the chemical and its hazard. Do not alter or otherwise deface container labels.
- I. All spills must be promptly cleaned up and the spilled chemical must be properly disposed of. Ensure spills do not enter sink drains. Contact EH&S at 64262 or Public Safety at 63333 immediately if a chemical spill gets into a sink or floor drain.

- J. Ensure that "Drain Disposal of Hazardous Chemicals is Illegal" stickers are posted at sinks at all times and replaced when necessary. Stickers are available from the EH&S office (6-4262).

- K. **DO NOT** store chemical containers next to sinks, including hazardous waste containers.

1.5 PRIOR APPROVAL

Employees must obtain prior approval to proceed with a laboratory task from the principal investigator when:

- A new hazard physical or health hazard is introduced, "new" being defined as being a physical or health hazard in which employees have not been previously trained.
- There is a substantial change in the amount of chemicals in the order of 300% or greater.
- There is a failure of any of the equipment used in the process, especially, safeguards such as fume hoods or clamp apparatus.
- Members of the laboratory staff become ill, suspect that they or others have been exposed, or otherwise suspect a failure of any safeguards.

1.6 SPILLS AND ACCIDENTS

Spills of toxic substances or accidents involving any hazardous chemicals that pose a human health or environmental risk should be reported immediately to the PI and/or University Police (63333). University Police are available to contact Triumvirate Environmental Services for emergency response activities. The University EH&S Department is responsible for notifying the Massachusetts Water Resources Authority of any chemical discharge into the waste water system that is not approved by the discharge permit or other technical approval.

1.7 PROCEDURES FOR HIGHLY TOXIC CHEMICALS

Additional safety precautions should be taken when dealing with highly toxic chemicals and agents such as carcinogens, mutagens, teratogens, biotoxins and other material with high acute toxicities. Examples of material that should be scrutinized for additional controls would include IARC Group 1 material, IARC Group 2A and 2B material, "known to be carcinogen" material in the Annual Report on Carcinogens (National Toxicological Program), acutely toxic material with a median lethal dose (LD₅₀) of less than 50mg/kg, and reproductive hazards (see MSDS for additional information).

Work with these materials should include additional safety precautions to include:

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- Order the smallest amount available and required.
- Check, confirm and use personnel protective equipment with the best permeation resistance.
- Work in a proper functioning and uncluttered fume hood or glove box.
- Consult an MSDS prior to use for emergency information, exposure routes, signs/symptoms of exposure.
- Ensure that all containers are labeled.
- Limit traffic in lab areas utilizing highly toxic material. Ensure material is secure when not in use.
- Ensure proper decontamination supplies are available and surfaces/equipment properly decontaminated after use.
- Ensure waste containers are properly labeled and waste material handled properly.

1.8 PROCEDURES FOR FLAMMABLE CHEMICALS

In general the flammability of a chemical is determined by its flash point, the lowest temperature at which an ignition source can cause the chemical to ignite momentarily under certain controlled conditions. See also the Brandeis Safety Operating Guideline *Flammable and Combustible Liquids Handling* for additional details.

- Chemicals with a flash point below 200F (93.3C) will be considered fire-hazard chemicals.
- Fire hazard chemicals should be stored in a flammable solvent storage area or in storage cabinets designed for flammable materials.
- Fire hazards chemicals should be used only in vented hoods and away from sources of ignition.

1.9 PROCEDURES FOR REACTIVE CHEMICALS

Reactivity information can be found in the "Handbook of Reactive Chemical Hazards" by L. Bretherick published by Butterworths (a copy is available in the Safety Office). Reactivity information should also be available on a manufacturer MSDS and labels.

As a general rule Brandeis shall ensure that any lab personnel who is handling or potentially exposed to a pyrophoric material (air & or water reactive) or other highly reactive material shall be made aware of and competent in the handling procedures for those materials. Labs are responsible for ensuring proper procedures are established and followed.

Handle reactive chemicals with all proper safety precautions, including segregation in storage and prohibition on mixing even small quantities with

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other chemicals without prior approval and appropriate personal protection and precautions.

1.10 PROCEDURE FOR CORROSIVE CHEMICALS AND CONTACT-HAZARD CHEMICALS

Corrosivity, allergenic, and sensitizer information is sometimes given in manufacturer MSDSs and on labels.

A CORROSIVE CHEMICAL IS ONE THAT:

Fits the EPA definition of corrosive in 40 CFR 261.22 (has a pH greater than 12 or less than 2.5) or is known or found to be corrosive to living tissues.

Handle corrosive chemicals with all proper safety precaution, including wearing both safety goggles and face shield, gloves tested for absence of pin holes and known to be resistant to permeation or penetration, and a laboratory apron or laboratory coat.

1.11 PROCEDURES FOR HANDLING OXIDIZERS

Oxidizing agents, for example hydrogen peroxide, nitrates, perchlorates, hypochlorites, ozone, Fluorine etc., can initiate combustion and therefore should not be stored in the same area with fuel, such as flammable, organic chemicals, or reducing agents. They should be stored on fire resistant shelving and segregated. See also the Brandeis Safety Guideline *Oxidizing Chemicals*.

1.12 PROCEDURES FOR HANDLING COMPRESSED GASES

Compressed gas cylinders present unique hazards because they have the potential to pose both mechanical and chemical hazards. Hazards arise from the potential reactivity and toxicity of the gas, high rate of diffusion during release, as well as physical hazards caused by the size and weight of cylinders. Asphyxiation can be caused by high concentrations of even "harmless" gases such as nitrogen, as well as the potential for frostbite during gas release. Finally, the large amount of potential energy resulting from the compression of the gas makes a compressed gas cylinder a potential rocket.

Cylinders should always be clearly marked. They should be secured at all times when in use, storage or transport. Cylinders with valve cover should be transported only when the valve is closed and the valve cover secured on the cylinder. Only the appropriate type of regulator should be used on a particular cylinder and only personnel who are competent in using cylinders should be attaching or dismantling regulators. Cylinders should always be stored in a well ventilated safe place that is protected from accidental tip over and away from sources of ignition and oxidizers if it is a flammable gas. Empty cylinders should be clearly marked as "Empty".

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1.13 CONTROL MEASURES AND EQUIPMENT

Chemical safety is achieved by continual awareness of chemical hazards and by keeping the chemical under control by using precautions, including administrative and engineering safeguards such as inventory control, material substitution, general and work site exhaust (hoods) and glove boxes. Laboratory personnel should be familiar with the precautions to be taken, including the use and practice of these controls. Engineering safeguards and controls must be properly maintained, inspected on a regular basis, and never overloaded beyond their designed limits.

ADMINISTRATIVE CONTROLS

Administrative controls should be reviewed and incorporated wherever possible by lab personnel to include such actions as hazard reviews, establishment of safety protocols/procedures, in-lab safety reviews and communications, in-lab supervision, avoidance of working alone in labs with highly toxic or reactive materials. Controls should be established to help reduce the duration or frequency of exposure as well as the severity of exposure by working to reduce experiment size to minimize personal exposure (dose & time).

ENGINEERING CONTROLS

FUME HOODS

The laboratory fume hood is one of the most important safety devices in the laboratory.

Use: The ventilation system in the laboratory has been carefully balanced to ensure proper airflow and comfortable working conditions. To prevent cross drafts, laboratory doors should be kept closed, whenever possible. Contact the Lab Facility Maintenance Group with any ventilation issues.

Containers and equipment should be kept 6" back from the front sash of the hood to prevent air flow restriction and turbulence.

Maintenance: Laboratory fume hoods shall be evaluated by Environmental, Health and Safety or outside contractors at least annually. During these evaluations, average face velocity of the hood is measured, and the hood air flow characteristics and turbulence (if any) is visually evaluated with smoke tubes.

Hoods passing evaluation are labeled at an 18" sash height with a fume hood inspection sticker indicating the date of evaluation. If a hood face velocity is below 80 cfm, the failed hood(s) is reported to the Lab Facility Maintenance Group for service and are reevaluated when service has been completed.

1.14 CHEMICAL STORAGE: FLAMMABLE STORAGE CABINETS

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Cabinets designed for the storage of flammable materials should be properly used and maintained. Read and follow the manufacturer information and also follow these safety practices:

- A. Store only compatible materials inside a cabinet.
- B. **DO NOT** store paper or cardboard or other combustible packaging material in a flammable liquid storage cabinet.
- C. Check storage capacities in the *Flammable and Combustible Liquids Handling* operating guideline.

1.15 EYEWASHES AND SAFETY SHOWERS

Eyewash stations are required in any lab where there is the potential for eye injury from exposure to injurious corrosive chemicals.

Requirements: The eyewash station must be capable of providing a continuous, soft stream of tepid water for at least 15 minutes. Personal eyewash units composed of bottled solution are generally not acceptable. Drench hoses may support eyewash stations, but do not replace them. Sink mounted eyewash generally do not replace use-specific eye wash stations.

Location: Eyewash stations should be located within 10 seconds travel time from the location of the hazard and on the same level (no stairs/ramps). Eye wash locations should be marked with a highly visible sign.

Maintenance: Brandeis will establish a PM program to have eyewash stations be flushed at least quarterly for 3-5 minutes to assure function and avoid build-up of bacteria. The path to the eyewash station must be free from obstructions.

Use: After any eye contact with a chemical, activate the eyewash station and flush eyes for at least 15 minutes. If the chemical is alkaline, flush for at least 30 minutes. Avoid rinsing the chemical into the uninjured eye. If contact lenses are in place, flush for one minute, remove the lenses, and continue flushing. After flushing for the appropriate amount of time, seek medical attention at the Brandeis University Health Center or the nearest emergency room.

Safety showers should be provided where chemicals are handled.

Requirements: Safety showers should provide at least 20 gallons of water per minute. The valve should be simple to activate and should remain activated until intentionally shut off. The valve should be within reach and not more than 69 inches above the floor.

Location: Safety showers should be located within 10 seconds travel time from the location of the hazard and on the same level (no stairs/ramps). Eye wash locations should be marked with a highly visible sign. The location should be marked with a clearly visible sign and, if possible, a large yellow circle should be painted on the floor under the shower.

Maintenance: Brandeis will establish a PM program to have Safety showers flushed annually. The path to the safety shower must be kept free from obstructions.

Use: In case of skin contact with a hazardous chemical, immediately activate the shower and flush the affected area for at least 15 minutes. If the chemical is alkaline, flush for at least 30 minutes. For contact with dry solids, brush the contaminant gently off the skin before using the shower. While under the shower, remove clothing and jewelry from the affected area. After flushing, seek medical attention immediately at the Brandeis University Health Center or the nearest emergency room.

1.16 RESPIRATORS

OSHA requires all employers to primarily prevent atmospheric contamination. If that cannot keep the vapor concentration below regulated levels, then the employer will implement a written respirator program (see 29 CFR 1910.134). The written respirator program will discuss such issues as respirator selection criteria, inspection, and maintenance. All personnel using respirators must be medically cleared, trained and fit tested in their proper use and care prior to using a tight fitting respirator (not a dust mask).

1.17 SIGNS AND SYMPTOMS OF EXPOSURE

Do not use odor as a means of determining that inhalation exposure limits are or are not being exceeded. Whenever there is reason to suspect that a toxic chemical inhalation limit might be exceeded, whether or not a suspicious odor is noticed notify your supervisor, the PI or Professor. Upon request, the Safety Office may monitor the air to determine if the permissible exposure level has been exceeded.

The MSDS should be reviewed for which lab personnel are not familiar with the routes and symptoms of exposure.

1.18 SPECIAL PROCEDURES FOR CARCINOGENS

OSHA has noted that many laboratory workers use known or suspected carcinogens. While industrial workers might use only one or a limited few chemical carcinogens, laboratory workers are likely to use many such chemicals. (See also Section 1.7).

To limit possible exposures, Brandeis lab personnel should establish special procedures and precautions for work with carcinogens. Check the container label or the MSDS for

carcinogen determination. Special precautions including but not limited to those listed below may be put in place when handling carcinogens.

A. REGULATED AND CONTROLLED WORK AREAS

Special work areas are designed for work with carcinogens. The rooms, including storage areas for the chemical carcinogens, will have restricted access. Signs stating "Authorized Personnel Only" will be posted at entrances to these work areas, and if necessary the areas will be locked. Only personnel with special instruction on the hazards and safe handling of carcinogens will be permitted access to the areas. The rooms where carcinogens are used and stored should be kept at a slight negative pressure when compared to the rest of the rooms.

B. CLOSED SYSTEM PROTECTION

All work involving carcinogens must be done in specially equipped closed systems to reduce the risks of employee exposure to the vapors. The closed systems include fume hoods, glove boxes or similar devices.

C. HANDLING OF CONTAMINATED WASTE WATERS

Rinse water and other waste waters contaminated with carcinogens are to be collected for disposal.

D. PERSONAL HYGIENE

Laboratory workers using carcinogens shall take extra precautions in maintaining good personal hygiene. In addition to hygiene practices in Section 1.2 workers will wash before leaving the facility. No food, beverage or tobacco products will be permitted in the restricted area.

E. PROTECTION OF VACUUM SYSTEMS

To protect vacuum lines and pumps, HEPA filters or high efficiency scrubber systems should be used.

F. PROTECTIVE APPAREL

Persons working in restricted areas should not wear any personal items such as jewelry which might be lost if decontamination is not possible. When possible, disposable clothing should be used. Gloves and long sleeves should be used at all times to prevent skin contact with the carcinogen.

G. ADDITIONAL PRECAUTIONS

Work with carcinogens should be done with the smallest amounts possible, purchase of the chemical should be restricted to minimal amounts necessary to prevent uninterrupted work.

1.19 HAZARD SPECIFIC SAFETY PROCEDURES

<http://www.brandeis.edu/ehs/docs/chprev02.DOC> Page 12

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Specific safety procedures shall be developed by labs when the general safety procedures established in this Chemical Hygiene Plan and/or a Brandeis Safety Operating Guideline do not adequately address the hazard(s). Procedures must be written to clearly identify additional precautions and controls to protect the health and safety of personnel. This should include the evaluation of the hazard(s), special controls (administrative/engineering), personal protective equipment, emergency procedures, any special decontamination and/or disposal procedures. These procedures shall be made available to and clearly communicated to lab personnel to ensure they are competent in following the applicable procedures.

1.20 SUSPECTED EXPOSURE TO TOXIC SUBSTANCES

There may be times when employees suspect that they have been exposed to some toxic substance in their laboratory. If the circumstances surrounding the complaint are determined to cause a reasonable suspicion of exposure to a chemical, then the University EH&S Manager may initiate actions to formally evaluate the complaint. The victim is entitled to a medical consultation and, if so determined in the consultation also to a medical examination at no cost and with no loss of working time attributed to the victim.

The following are examples of some events or circumstances which might reasonably consider as evidence that an exposure to toxic substances is likely:

- A. Victim had direct skin or eye contact with a chemical substance.
- B. Odor was noticed especially if person was working with any chemical which has a lower TLV than odor threshold.
- C. Manifestation of health hazard symptoms such as headache, rash, nausea, coughing, tearing, irritation or redness of eyes, irritation of nose or throat, dizziness, loss of motor dexterity or judgment which resemble drunkenness etc.
- D. Some or all symptoms disappear when person is taken away from chemical area into fresh air.

EXPOSURE EVALUATIONS

Once a complaint of possible hazardous chemical exposure has been received, the complaint should be documented in a short memo along with the decision of appropriate action. If it was decided that no further evaluation of the event is necessary, the reason for that decision should be included in the document. If a

<http://www.brandeis.edu/ehs/docs/chprev02.DOC> Page 13

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decision is made that the complaint should be investigated, then a formal exposure evaluation will commence.

1.21 EMPLOYEE INFORMATION AND TRAINING

The CHO or the delegated Safety Officer is responsible to ensure that anyone who performs lab related duties in his/her respective lab is aware of and is competent in the General Rules in section 1.1 and the requirements listed here.

- A. Providing all laboratory personnel with information and training concerning the hazards of chemicals in the laboratory. This shall include an annual evaluation of the hazards and documenting this evaluation on the Brandeis Lab Hazard Evaluation Form. Communication of these hazards shall be documented on the Brandeis Training Log. *Evaluation forms and Logs are available at www.brandeis.edu/ehs.*
- B. Making lab personnel aware of the location, availability and content of this document (CHP). Contact your PI or the EH&S Office for a copy of this Plan.
- C. Exposure Limits including TLV (Threshold Limit Value) and PEL (Permissible Exposure Limits). Know how to find and use an MSDS for this information.
- D. Signs and symptoms associated with exposures to the hazardous chemical used in the laboratory. Know how to find and use an MSDS for this information.
- E. The location of available reference materials including Material Safety Data Sheets (MSDS) located in the hall in Kalman outside of the Safety Office.
- F. The measures employees can use to protect themselves from chemical hazards, including specific procedures such as appropriate administrative and engineering controls, personal protective equipment to be used, and emergency procedures.

Information does not need to be a formal training session in a classroom setting. Information can be disseminated "on-the-job". All incoming undergraduate students are required to complete the Boston Consortium on line training. The CHO or Safety Officer are responsible for communicating lab specific hazards and controls. A record must be kept of these hazard reviews (Boston Consortium general training AND Lab specific hazards). Graduate students, Post Docs and Faculty shall complete initial on line Boston Consortium training (see EH&S web site for link). Review of Lab Hazard Evaluation forms shall be completed and documented annually.

- 1.22 The Laboratory Standard requires that records of all Exposure Evaluations, Medical Consultations and reports be maintained in accordance to 29 CFR 1910.20. All records should be kept for at least as long as the employees affected are employed at the facility. OSHA requires some records to be kept for thirty 30 years beyond the employee time of employment. Employee Relations (Human Resources) will maintain necessary records.

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Brandeis Safety Operating Guidelines

Title: Chemical Storage Compatibility

Revision 00

Date 06/01/09

Pages 1 of 6

WHAT IS THE SCOPE OF THIS GUIDELINE?

This Guideline applies to all lab personnel working with hazardous materials in a lab.

The storage of chemicals properly is critical in reducing potential interactions that could cause fire, explosion, evolution of toxic fumes or gases and other potentially hazardous conditions.

HOW DO I PROTECT MYSELF?

Review the material safety data sheet (MSDS) prior to using these materials.

Store hazardous materials in accordance with manufacturer's recommendations, material safety data sheet information and this guidance.

COMPATABILITY INFORMATION

Segregation and Storage With Respect To Hazard Class

Acids

- Segregate acids from reactive metals such as sodium, potassium, and magnesium.
- Segregate oxidizing acids from organic acid and flammable and combustible materials.
- Store **acetic acid** as a flammable liquid. This is an organic (carboxylic) acid that will react if it comes in contact with an oxidizing acid.
- **Nitric acid** and **hydrochloric acid** may be stored in the same corrosive storage cabinet, but they must be kept in **separate drip trays**. These can combine to form chlorine and nitrosyl chloride gases—both are toxic.

- Segregate acids from chemicals that could generate toxic or flammable gases upon contact, such as sodium cyanide, iron sulfide and calcium carbide.
- Segregate acids from bases.

Bases

- Segregate bases from acids, metals, explosives, organic peroxides and easily ignitable materials.
- Do not store aqueous sodium and potassium hydroxide solutions in aluminum drip trays. These will corrode aluminum.

Solvents (Flammable and combustible liquids)

- Store in approved safety cans or cabinets.
- Segregate from oxidizing acids and oxidizers.
- Keep away from any source of ignition: heat, sparks, or open flames.

Oxidizers

- Keep away from combustible and flammable materials.
- Keep away from reducing agents such as zinc, alkali metals, and formic acid.

Cyanides

- Segregate from aqueous solutions, acids and oxidizers.

Water-Reactive Chemicals

- Store in a cool, dry place, away from any water source.
- Make certain that a Class D fire extinguisher is available in case of fire.

Pyrophoric Substances

- If in original container store in a cool, dry place, making provisions for an airtight seal.
- Store in a glove box after the material has been opened.

Light-Sensitive Chemicals

- Store in amber bottles in a cool, dry, dark place.

Peroxide-Forming Chemicals

- Most peroxide forming chemicals are also flammable liquids. Therefore, store in airtight containers in a flammable storage locker.
- Segregate from oxidizers and acids.

Toxic Chemicals

- Store according to the nature of the chemical, using appropriate security where necessary

SEGREGATION TABLE

CHEMICAL	KEEP OUT OF CONTACT WITH
Acetic acid	Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides, permanganates and other oxidizers
Acetone	Concentrated nitric and sulfuric acid mixtures, and strong bases
Acetylene	Chlorine, bromine, copper, fluorine, silver, mercury
Alkali metals	Water, carbon tetrachloride or other chlorinated hydrocarbons, carbon dioxide, the halogens
Ammonia, anhydrous	Mercury, chlorine, calcium hypochlorite, iodine, bromine, hydrofluoric acid
Ammonium nitrate	Acids, metal powders, flammable liquids, chlorates, nitrites, sulfur, finely divided organic or combustible materials
Aniline	Nitric acid, hydrogen peroxide
Arsenic materials	Any reducing agent
Azides	Acids
Bromine	Same as chlorine
Calcium oxide	Water
Carbon (activated)	Calcium hypochlorite, all oxidizing agents
Carbon tetrachloride	Sodium
Chlorates	Ammonium salts, acids, metal powders, sulfur, finely divided organic or combustible materials

Chromic acid and chromium trioxide	Acetic acid, naphthalene, camphor, glycerol, glycerin, turpentine, alcohol, flammable liquids in general
Chlorine	Ammonia, acetylene, butadiene, butane, methane, propane (or other petroleum gases), hydrogen, sodium carbide, turpentine, benzene, finely divided metals
Chlorine dioxide	Ammonia, methane, phosphine, hydrogen sulfide
Copper	Acetylene, hydrogen peroxide
Cumene hydroperoxide	Acids, organic or inorganic
Cyanides	Acids
Flammable liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Hydrocarbons	Fluorine, chlorine, bromine, chromic acid, sodium peroxide
Hydrocyanic acid	Nitric acid, alkali
Hydrofluoric acid	Ammonia, aqueous or anhydrous, bases and silica
Hydrogen peroxide	Copper, chromium, iron, most metals or their salts, alcohols, acetone, organic materials, aniline, nitromethane, flammable liquids
Hydrogen sulfide	Fuming nitric acid, other acids, oxidizing gases, acetylene, ammonia (aqueous or anhydrous), hydrogen
Hypochlorites	Acids, activated carbon
Iodine	Acetylene, ammonia (aqueous or anhydrous), hydrogen
Mercury	Acetylene, fulminic acid, ammonia
Nitrates	Sulfuric acid
Nitric acid (concentrated)	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases, copper, brass, any heavy metals
Nitrites	Acids
Nitroparaffins	Inorganic bases, amines
Oxalic acid	Silver, mercury
Oxygen	Oils, grease, hydrogen, flammable liquids, solids, or gases

Perchloric acid	Acetic anhydride, bismuth and its alloys, alcohol, paper, wood, grease, and oils
Peroxides, organic	Acids (organic or mineral), avoid friction, store cold
Phosphorus (white)	Air, oxygen, alkalis, reducing agents
Potassium	Carbon tetrachloride, carbon dioxide, water
Potassium chlorate and perchlorate	Sulfuric and other acids
Potassium permanganate	Glycerin, ethylene glycol, benzaldehyde, sulfuric acid
Selenides	Reducing agents
Silver	Acetylene, oxalic acid, tartaric acid, ammonium compounds, fulminic acid
Sodium	Carbon tetrachloride, carbon dioxide, water
Sodium nitrite	Ammonium nitrate and other ammonium salts
Sodium peroxide	Ethyl or methyl alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulfides	Acids
Sulfuric Acid	Potassium chlorate, potassium perchlorate, potassium permanganate (or compounds with similar light metals, such as sodium, lithium, etc.)
Tellurides	Reducing agents

(Berkeley National Labs)

HANDLING EMERGENCIES

Anticipate emergency situations. Have proper handling equipment in the lab and readily available for spills. Check the MSDS to determine what is appropriate.

In the event of a spill or adverse reaction notify lab personnel immediately that an incident has occurred. Do not attempt to handle a large spill/reaction/fire, or one in which you are not trained or equipped for. Turn off all ignition sources if this can be done safely, vacate the area and call for assistance.

Laboratory emergencies should be reported to the Public Safety Office at 63333. Public Safety will also contact the EH&S Office at 64262. Communicate the following:

- Location of spill/incident
- Type of material involved and quantity
- Injuries involved
- Fire/explosion
- Your location/contact information (or who to contact for further information)

Notify the PI or designated Safety Officer as soon as possible also.

WASTE DISPOSAL REQUIREMENTS

Disposal requests should be called into the Waste Hotline at 62561.



Brandeis Safety Operating Policy

Title: Compressed Gas Transport and use	Revision: 00	Date: 1/8/08	Pages: 1 of 2
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WHAT IS THE SCOPE OF THIS GUIDELINE?

This Guideline identifies general safety precautions that should be reviewed and followed when dealing with compressed gas cylinders at Brandeis. The MSDS for specific gases should be reviewed to identify and understand the hazards for those gases prior to use.

MSDS for Airgas cylinders can be found at:

<http://www.airgas.com/content/msds.aspx>

WHAT ARE THE HAZARDS I COULD BE EXPOSED TO?

- Impact from falling cylinders (keep them secure)
- Fire & Explosion
- Poisoning
- Asphyxiation (displacing oxygen)
- Over exposure
- Frostbite or gas injection under skin
- Hazards from broken cylinder heads

CYLINDER TRANSPORT AND STORAGE

When transporting high and low pressure cylinders an approved cart must be used. The **cylinder cap*** must be in place and secure (DO NOT transport any cylinder with a regulator attached). Ensure that cylinder straps are secure on the cart if provided. **Use a cylinder cart!**

Cylinders of compressed gases pose a significant hazard if the valve is damaged or broken off and must be handled as high energy sources. The cylinder cap



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MUST be in place and secure when storing (when not in use) or moving a cylinder. Use suitable racks, straps, chains or stands to support cylinders. Do not store cylinders or lecture bottles with the regulator in place. If the regulator fails, the entire contents of the gas cylinder may be discharged.

Follow these guidelines:

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- Type
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- Ensure that empty & full bottles are labeled & separated
- Caps are installed
- Store upright & away from heat sources
- Store in dry & well ventilated areas
- Ensure that Oxygen cylinders are stored separately
- Ensure that cylinders are chained or strapped to prevent tipping
- No smoking around storage or use areas
- Fuel gas and oxygen stored a minimum of 20 feet apart or separated by a 1-hour fire wall
- Ensure straps and clamps are in good condition



HANDLING EMERGENCIES INVOLVING COMPRESSED GASSES

All staff should be made aware of emergency notification procedures related to compressed gas emergencies. In the event of a release or potential for release, or personal injury, fire, explosion or other hazard, contact University Police at 63333. The University Police will notify the appropriate parties including the Environmental Health & Safety Department (64262).

Prior to use of any compressed gas, be aware of the location and use of emergency equipment including first aid kits, eye wash stations and showers, fire pull stations and fire extinguishers.

Plans should also be established in each area to identify gas controls. Attempts to isolate and shut off compressed gasses in an emergency should only be done without risk to Brandeis students, staff or faculty.

The Department ordering compressed gases is responsible for ensuring that

a Material Safety Data Sheet is provided to the EH&S Department prior to the receipt of the gas on campus.

ENGINEERING & ADMINISTRATIVE CONTROLS

Engineering Controls

Gas cylinder storage areas
Flow Restrictors
Leak Monitors
Fume hoods
Ventilation systems
Sprinkler systems

Administrative Controls

Inspections
Employee training
Segregation of gas containers
Inspections and audits
Signs & Labels
Personal Protective Equipment use
Identification of authorized employees
Procedures for receipt, use and storage

HOW DO I PROTECT MYSELF

Ensure that you review the MSDS for any compressed gas if you are not familiar with its potential hazards.

Follow that handling and transport guidelines in this document.

Use proper personal protective equipment when handling cylinders of cryogenic materials (See Guideline #23).

WASTE DISPOSAL REQUIREMENTS

Contact the Hazardous Waste Hotline at 62561 or the Environmental Health & Safety Department at 64262 if you have any compressed gas cylinders for disposal.



Brandeis Standard Operating Guidelines



Title: Corrosive Chemicals

Revision 00

Date 1/5/08

Pages 1 of 2

WHAT IS THE SCOPE OF THIS GUIDELINE?

This Guideline identifies general safety precautions that should be reviewed and followed when dealing with **corrosive chemicals** at Brandeis. They represent a significant hazard because skin or eye contact can readily occur from splashes and their effect on human tissue generally takes place very rapidly.

Examples of corrosives: Glycolic acid, Imidazole, 4-Methoxybenzylamine, Sodium hydroxide, amines, Sulfuric acid, Bromine, Hydrogen peroxide. Corrosive gases and vapors are also extremely hazardous. Examples which can cause severe irritation and bodily injury include ammonia, hydrogen chloride, nitrogen dioxide and sulfur dioxide.

HOW DO I PROTECT MYSELF?

Eye Protection

Safety glasses that meet the ANSI Z.87.1 1989 standard should be worn whenever handling corrosive chemicals. Ordinary prescription glasses will NOT provide adequate protection unless they also meet this standard. Safety glasses should also be equipped with side shields if there is a possibility of flying particles (i.e. glass, plastics). When there is the potential for significant splash hazards, additional eye/face protection should be worn in the form of goggles or a face shield.

Skin Protection

Gloves should be worn when handling corrosive chemicals. **Nitrile** gloves should be adequate for handling most of these in general laboratory settings. An MSDS should be reviewed if handling may involve extended or high exposure to lab personnel to ensure adequate skin protection is provided.

In addition a lab coat or apron is advised if exposure could involve more than normal handling operations would be expected. No open toe shoes are allowed.

SPECIAL HANDLING

Never store corrosive liquids above eye level.

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Always add acids or bases to water (and not the reverse).

Segregate acids and bases in storage.

When mixing corrosive solids with water, always slowly add the corrosive solid to the water, stirring continuously. Cooling may also be necessary.

If there is a possibility that you may generate a significant amount of dust, conduct work in a fume hood.

If the potential exists for explosion or a high thermal reaction, additional shielding should be utilized. This may involve the use of shielding in a glove box or in the case of a fume hood with the sash in the lowest possible position. Portable shields may also be used for additional protection.

Store corrosives material away from heat/flames, oxidizers and water sources. Keep containers closed and ensure that manufacturer's labels and warnings remain intact.

Special Considerations for Corrosive Gases

For potentially corrosive gases perform manipulations of materials that pose an inhalation hazard in a chemical fume hood to control exposure or wear appropriate respiratory protection.

Ensure that you protect all exposed skin surfaces from contact with corrosive or irritating gases and vapors.

Ensure that regulators and valves of gases are closed when the cylinder(s) are not in use and properly purged and cleaned with dry air or and inert gas such as nitrogen.

Ensure that when corrosive gases are to be discharged into a liquid, a trap, check valve, or vacuum break device is employed to prevent dangerous reverse flow.

HANDLING EMERGENCIES INVOLVING CORROSIVE CHEMICALS

Anticipate emergency situations, have proper handling equipment in the lab and readily available for spills. **Acid and base spill kits** are available in the Main Hazardous Waste Accumulation area. Contact EH&S (64262) or the Hazardous Waste Hotline (Monday/Thursday) (62561) for access. It is also highly recommended that spill control material/kits be maintained in the lab.

In the event of a spill or adverse reaction notify lab personnel immediately that an incident has occurred. Do not attempt to handle a large spill/reaction/fire, or one in which you are not trained or equipped for.

Laboratory emergencies should be reported to the Public Safety Office at **63333**. Public Safety will also contact the EH&S Office at **64262**. Communicate the following:

- Location of spill/incident

- Type of material involved and quantity
- Injuries involved
- Fire/explosion
- Your location/contact information (or who to contact for further information)

Notify the PI or designated Safety Officer as soon as possible also.

WASTE DISPOSAL REQUIREMENTS

Handling and disposal of corrosive chemicals should be done in accordance with lab protocol established by the PI.

Aqueous solutions between pH 6.0 to 10.0 may be disposed of down the sink. Contact the Environmental Health & Safety Department (64262) with any question concerning sink disposal of material other than aqueous solutions described here. The University operates under a discharge permit from the Massachusetts Water Resources Authority and has specific discharge limits.

Disposal requests should be called into the Waste Hotline at **62561**.

DECONTAMINATION PROCEDURES

Clean up and decontamination may require the use of neutralizing agents. Review the MSDS for additional guidance and personal protection.



Brandeis Safety Operating Guidelines



Title: Cryogenic Materials	Revision: 00	Date: 01/19/08	Pages: 1 of 4
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WHAT IS THE SCOPE OF THIS GUIDELINE?

This Guideline applies to all lab personnel working with **cryogenic materials** such as Liquid Nitrogen and Dry Ice (Carbon dioxide solid).

Cryogenic materials pose significant skin contact hazards and can cause asphyxiation hazards in small or confined spaces. Avoid direct skin contact!

HOW DO I PROTECT MYSELF?

Review the material safety data sheet (MSDS) prior to using these materials.

Eye Protection & Skin Protection

The following PPE is highly recommended when handling cryogenic materials:

1. Cryo-gloves
2. Face Shield
3. Safety goggles (not just safety glasses)
4. Lab coat
5. Long pants (cuffless)

Restrictions:

1. No shorts
2. No open toe shoes or sandals



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ADDITIONAL SAFETY RECOMMENDATIONS

- Follow any lab specific handling procedures.
- Remove all metal jewelry from wrists and hands (a spill/splash could freeze jewelry to your skin)
- Always use tongs when handling objects in cryogenic liquids.
- Always wear cryo-gloves when dispensing a cryogenic liquid. Note: Cryo-gloves only provide short-term protection against accidental skin exposures and are not designed to protect skin against prolonged contact.
- Only fill a dewar from a transfer line that has a phase separator attached to the end of the line. Phase separators separate gas from liquid preventing an overabundance of gas from surrounding the end of the transfer line and allow only liquid nitrogen to fall into the dewar.

Dewar examples



- When filling a dewar flask at a filling station, place the phase separator so that it rests on the bottom of the dewar. Do not allow the cryogen to splash into the dewar.
- Dispense directly into the dewar. Never use a funnel in the dispensing process. The funnel can freeze creating a splash hazard.
- Use stainless steel tubing to transfer cryogens. Never use rubber or plastic tubing. The temperature can cause rubber or plastic tubing to become brittle and crack, spraying the liquid onto surrounding surfaces. Never fill a dewar or storage vessel if the tubing is damaged. (Liquid helium must be transferred through a vacuum insulated tube because of its extremely low heat of vaporization.)

- Never overfill a dewar. This may cause liquid nitrogen to leak into the cryotubes stored in the dewar. Upon removal from the dewar, cryotubes may explode when the liquid nitrogen inside is warmed and expands.
- Never leave a filling process unattended.
- When cooling objects with liquid nitrogen lower them very slowly into the liquid using tongs to prevent boiling and splashing.
- Always use an appropriate wheeled cart to transport a dewar or storage vessel. Never pull, push or roll a dewar or storage vessel.
- Use extreme caution when handling equipment that has been exposed to a cryogenic material and avoid skin contact. Skin or eye contact with cryogenic liquids, cold equipment and materials that are used in conjunction with cryogens, or splashing liquid may cause severe tissue damage such as burns, frostbite, and eye damage.
- Do NOT tamper with pressure relief valves on cryogenic storage containers.
- Also ensure that whatever you are putting a cryogenic material into is suitable for the material. Glass dewars should be wrapped in protective mesh or taped.
- **BEST PRACTICE WHEN TRANSPORTING A DEWAR IS TO AVOID TRAVELING WITH A DEWAR IN A PASSENGER ELEVATOR.** Release of a material such as liquid nitrogen in the small space such as an elevator may pose an asphyxiation hazard. Employ the buddy system and have a fellow employee/student remain outside the elevator on the sending and receiving floors. **Nitrogen does not have good warning properties and can displace Oxygen to dangerously low levels.**
- Use extreme caution with cryotubes. An explosion hazard exists if liquid nitrogen has entered the tube through any defects or cracks and may expand rapidly causing an explosion/shrapnel hazard.

HANDLING EMERGENCIES INVOLVING CRYOGENS

Anticipate emergency situations, have proper handling equipment in the lab and readily available for spills. Check the MSDS to determine what is appropriate.

In the event of a spill or adverse reaction notify lab personnel immediately that an incident has occurred. Do not attempt to handle a large spill/reaction/fire, or one in which you are not trained or equipped for. Turn off all ignition sources if this can be done safely, vacate the area and call for assistance.

Laboratory emergencies should be reported to the Public Safety Office at **63333**. Public Safety will also contact the EH&S Office at **64262**. Communicate the following:

- Location of spill/incident
- Type of material involved and quantity
- Injuries involved
- Fire/explosion
- Your location/contact information (or who to contact for further information)

Notify the PI or designated Safety Officer as soon as possible also.

If skin comes in contact with a cryogen or dry ice, run the area of skin under luke-warm water for fifteen minutes (do not use hot or cold water). Seek professional medical attention.

If your finger is burned do not place it in your mouth. This could burn your mouth.

Do not rub the area; rubbing can cause further tissue damage.

Spill: Do not attempt to clean up a spilled cryogen. If a large volume of gas is released, leave the area immediately and call Public Safety at **63333**.

WASTE DISPOSAL REQUIREMENTS

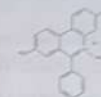
Disposal requests should be called into the Waste Hotline at **62561**.

SHIPPING WITH DRY ICE

Only personnel who have been trained in the proper shipment of Dry Ice may pack and offer for shipment. If you have not been trained either contact someone in your group who has, or contact the EH&S Department to obtain the **Brandeis University Guide to Shipping with Dry Ice**. You must read the Guide, complete the quiz and return it to the EH&S Office prior to packing and shipping anything in dry ice.



Brandeis Safety Operating Guidelines



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ENGINEERING/VENTILATION/ADMINISTRATIVE CONTROLS

ADMINISTRATIVE: Brandeis employees who work with hazardous chemicals must be apprised of the hazards of chemicals present in their work area. This training must be provided before initial assignment to a lab and distribution of keys or must work under supervision before training occurs. Lab personnel need to be trained on how to properly handle EB, the location of this material in the lab, the proper measure to handle and store it and measures to be used to clean up spills.

ENGINEERING CONTROLS:

Any procedure which could result in the production of EB aerosols should be done in a fume hood.

Proper safety precautions must also be taken when dealing with UV light.

SPECIAL HANDLING AND/OR STORAGE REQUIREMENTS

Store EB away from strong oxidizing agents in a cool, dry place, and ensure that the container is kept undamaged and tightly closed.

EB should be used in a specially designated area. All lab personnel should be made aware through training or appropriate hazard warnings (signs/labels) that EB is used in this area.

HANDLING EMERGENCIES INVOLVING ETHIDIUM BROMIDE

Anticipate emergency situations, have proper handling equipment in the lab and readily available for spills. Check the MSDS to determine what is appropriate.

In the event of a spill or adverse reaction notify lab personnel immediately that an incident has occurred. Do not attempt to handle a large spill/reaction/fire, or one in which you are not trained or equipped for. Turn off all ignition sources if this can be done safely, vacate the area and call for assistance.

Laboratory emergencies should be reported to the Public Safety Office at 63333. Public Safety will also contact the EH&S Office at 64262. Communicate the following:

- Location of spill/incident
- Type of material involved and quantity

- Injuries involved
- Fire/explosion
- Your location/contact information (or who to contact for further information)

Notify the PI or designated Safety Officer as soon as possible also.

If exposed to EB, skin/eye contact, immediately flush the eyes or skin with copious amounts of water for at least 15 minutes or until medical help arrives and you are instructed otherwise.

If EB dust is inhaled, move the victim to fresh air and contact Public Safety immediately for medical assistance.

Spills

Contact the EH&S Department of significant EB spills.

Always wear full protective clothing, as described above, during any cleanup procedure. You should only clean up spills if you are aware of the hazards and have the proper safety and cleanup equipment.

A spill of EB powder can be carefully wiped up with wet paper towels the area decontaminated. Utilize UV light to locate the spill.

A spill EB in liquid form should be absorbed with dry paper towels. Use a UV light source and illuminate the area to locate any remaining EB. All clean up material should be placed in containers for proper disposal. **Do Not place EB contaminated material in the regular trash.**

WASTE DISPOSAL REQUIREMENTS

All materials contaminated with EB should be packaged similar to hazardous waste at Brandeis and disposed of through the Brandeis Hazardous Waste Program as a special waste. If you do not have a waste container, contact the hazardous waste hotline at 62561 and leave a message including your name, location and question.

Disposal requests should be called into the Waste Hotline at 62561.

DECONTAMINATION PROCEDURES

Wash hands and arms with soap and water immediately after handling any chemical.

Clean work areas carefully when done. Dispose of contaminated material in a

hazardous waste storage container.
Prepare and utilize the following solution to decontaminate lab surfaces.

Decontamination Solution

Prepare the decontamination solution just prior to use. The solution is acidic so wear full protective equipment (lab coat, gloves, and goggles, not safety glasses) when preparing or using the decontamination solution. The solution consists of:

- 4.2 g of sodium nitrite (NaNO_2 , CAS # 7362-00-0)
- 20 ml of hypophosphorous acid (50%) (H_3PO_2 , CAS # 6303-21-5)
- 300 ml of water.

- 1) Wash the area with a paper towel soaked in decontamination solution. Then rinse the area five times with paper towels soaked with tap water, using a fresh towel each time.
- 2) Soak all the towels in decontamination solution for one hour. Then remove them, gently wring out excess solution, place in a sealed bag or container.
- 3) Using a UV light, check the area to ensure that all the EB has been removed.
- 4) Contact the Brandeis waste hotline for disposal of the decontamination solution, towels, and gloves used during the cleanup.
- 5) If the acid may damage the contaminated surface, use a few additional rinses. Again, soak all the towels in decontamination solution for at least one hour before disposal.



Brandeis Safety Operating Guidelines

Title: Flammable & Combustible Liquids Handling	Revision: 00	Date: 11/14/07	Pages: 1 of 2
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WHAT IS THE SCOPE OF THIS GUIDELINE?

All users of **flammable and combustible liquids** at Brandeis University must follow this Policy as a minimum level of protection. These guidelines apply to flammable and combustible liquids as defined by OSHA and the National Fire Protection Association (NFPA).

DEFINITIONS

The following classes are defined as "flammable":

CLASS	*FLASH POINT	BOILING POINT	EXAMPLES
IA	Below 73° F	Below 100° F	
IB	Below 73° F	At or above 100° F	
IC	At or above 73° F and below 100° F		

Note*: "Flashpoint" means the minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid (1910.106(a))

The following classes are defined as "combustible":

CLASS	FLASH POINT	EXAMPLES
II	100° - 139° F	
IIIA	140° - 199° F	
IIIB	200° F or above	

"Combustible liquid" means any liquid having a flashpoint at or above 100 deg. F. (37.8 deg. C.) (1910.106(a))

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ENGINEERING AND ADMINISTRATIVE CONTROLS

VENTILATION

Proper ventilation should be maintained when using flammable and combustible liquids. Material should be stored in approved flammable storage cabinets with a minimum stored on bench tops for experiment use, generally only enough for work being conducted.

FUME HOODS

Properly functioning fume hoods should be utilized when handling flammable and combustible liquids and should generally NOT be used as storage areas unless specifically designed.

REFRIGERATORS

Flammable and combustible liquids should not be stored in regular refrigerators. Refrigerators for the storage of flammable and combustible material shall meet the requirements for Class I locations and shall be appropriately marked [NFPA 45, 12.2.2].

When handling or using flammable and/or combustible liquids, all sources of ignition should be controlled or eliminated.

Do not store flammable or combustible materials near incompatible material, in particular with oxidizing materials.

HOW DO I PROTECT MYSELF?

Personnel handling flammable and combustible chemicals must wear adequate eye protection. Adequate safety glasses must meet the requirements of the Practice for Occupational and Educational Eye and Face Protection (ANSI Z.87.1 1989) and must be equipped with side shields. Ordinary prescription glasses do not provide adequate protection unless they meet this standard and are marked as such. Safety glasses with side shields do not provide adequate protection from splashes; therefore, when the potential for splash hazard exists other eye protection and/or face protection must be worn (i.e. splash goggles).

Gloves should be worn when handling flammable and combustible chemicals. Disposable nitrile gloves provide adequate protection against accidental hand contact with small quantities of most laboratory chemicals.

Appropriate protective clothing should be worn if the possibility of skin contact is likely. Open toe shoes are not appropriate when handling chemicals in a laboratory or in other areas where there is a potential for exposure.

SPECIAL HANDLING AND/OR STORAGE REQUIREMENTS

- Only approved containers shall be used to store flammable and combustible liquids.
- Table H-12 outlines the allowable maximum container size of flammable and combustible liquids and has been incorporated into this Policy from 29 CFR 1910.106. Please review exceptions a-c after the table for further clarification.

TABLE H-12 - MAXIMUM ALLOWABLE SIZE OF CONTAINERS AND PORTABLE TANKS

Container type	Flammable liquids ^a			Combustible liquids	
	Class IA	Class IB	Class IC	Class II	Class III
Glass or approved plastic.....	1 pt ^b	1 qt	1 gal	1 gal	1 gal. ^c
Metal (other than DOT drums).....	1 gal	5 gal	5 gal	5 gal	5 gal.
Safety cans.....	2 gal	5 gal	5 gal	5 gal	5 gal.
Metal drums (DOT specifications)...	60 gal	60 gal	60 gal	60 gal	60 gal.
Approved portable tanks.....	660 gal	660 gal	660 gal	660 gal	660 gal.

NOTE: Container exemptions: (a) Medicines, beverages, foodstuffs, cosmetics, and other common consumer items, when packaged according to commonly accepted practices, shall be exempt from the requirements of 1910.106(d) (2) (i) and (iii).

- a. Plastic coated glass containers as large as 4 L (1 gal) permitted.
- b. NFPA 45 allows maximum container size for Class IIIA of 20 L (5 gallons).
- c. For educational and instructional laboratories, Class I and Class II containers shall not exceed the following capacity: Safety cans no greater than 8 L (2.1 gal) or other containers of 4 L (1 gal). [NFPA 45]



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**MAXIMUM QUANTITIES OF FLAMMABLE AND COMBUSTIBLE
LIQUIDS IN SPRINKLERED LABORATORY UNITS OUTSIDE OF APPROVED
FLAMMABLE LIQUID STORAGE ROOMS**

Excluding Quantities in Storage Cabinets and Safety Cans

CLASS	Maximum Quantity per 100 sq. ft. of Lab Unit	Maximum Quantity per Unit***
Class I	7.5 L (2 Gals)	
Class I, II, III	15 L (4 Gals)	570 L (150 Gals)
		757 L (200 Gals)

Note: This is for the classification of a Laboratory Unit Fire Hazard Class C, low fire hazard. (NFPA 45 - 2004)

Including Quantities in Storage Cabinets and Storage Cans

CLASS	Maximum Quantity per 100 sq. ft. of Lab Unit	Maximum Quantity per Unit***
Class I		
Class I, II, III	15 L (4 Gals)	1136 L (300 Gals)
	30 L (8 Gals)	1515 L (400 Gals)



- Not more than 60 gallons of Class I or Class II liquids, nor more than 120 gallons of Class III may be stored in a storage cabinet.

HANDLING EMERGENCIES INVOLVING FLAMMABLE CHEMICALS

Anticipate emergency situations, have proper handling equipment in the lab and readily available for spills. Check the MSDS to determine what is appropriate.

In the event of a spill or adverse reaction notify lab personnel immediately that an incident has occurred. Do not attempt to handle a large spill/reaction/fire, or one in which you are not trained or equipped for. Turn off all ignition sources if this can be done safely, vacate the area and call for assistance.

Laboratory emergencies should be reported to the Public Safety Office at 63333. Public Safety will also contact the EH&S Office at 64262. Communicate the following:

- Location of spill/incident
- Type of material involved and quantity
- Injuries involved
- Fire/explosion
- Your location/contact information (or who to contact for further information)

Notify the PI or designated Safety Officer as soon as possible also.

WASTE DISPOSAL REQUIREMENTS

All flammable and combustible waste must be disposed of as hazardous waste through the Brandeis University hazardous waste program (Call 62561, leave message).

DECONTAMINATION PROCEDURES

Wash hands and arms with soap and water immediately after handling any chemical.

Clean work areas carefully when done. Dispose of contaminated material in the hazardous waste storage container. Do not dispose of waste with incompatible material. Paper towels or other similar material may pose a fire risk when contaminated. Proceed with caution when working with flammables and combustibles around other organic material (paper, wood, cloth).

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Brandeis Safety Guideline



Title: Glassware Handling & Disposal

Revision: 00

Date: 12/28/07

Pages: 1 of 2

This Guideline will provide information regarding how to handle, package and dispose of **glass** from Brandeis University labs. The information in this Guideline applies to anyone disposing of glass from Brandeis labs.

This does not apply to

- **Sharps:** a device or item having corners, edges, or projections capable of cutting or piercing the skin.
- **Infectious Waste Sharps:** sharps, including hypodermic needles, syringes (with or without the attached needle), Pasteur pipettes, scalpel blades, blood vials, needles with attached tubing, culture dishes, suture needles, slides, cover slips and other broken or unbroken glass or plasticware that have been in contact with infectious agents or that have been used in animal or human patient care, treatment, or research.

GLASS, HANDLING, PACKAGING & DISPOSAL

All glassware for disposal must be packaged in a **secure box which is lined with a poly bag**. DO NOT throw glassware in regular trash cans. Boxes are available through Fisher. Any **undamaged corrugated box is suitable and must also be poly bag lined (2 mil)**.



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All containers *must* be clearly labeled with one of the following:

- Laboratory Glassware
- Lab Glassware Only
- Broken Glass

Pipettes that do NOT contain any biological or infectious material can be handled as broken glass.

Deface or remove labels of empty chemical reagent bottles before discarding in laboratory glassware containers.

When a glassware cardboard box is $\frac{3}{4}$ full, seal the top of the box with packaging tape to indicate to Custodial services that the box is ready for disposal.

Keep glassware for disposal separate from all other waste in the laboratory. Laboratory glassware cannot be recycled.

Make sure the contents of the container have been removed including as much residual as possible, by the ordinary means of removal from the container (i.e. pouring, scooping; If it contained a liquid and liquid can still drip out, it is not empty yet, let it drain.)

DO NOT discard glassware in these containers if it contains hazardous chemicals, infectious or radioactive contaminants. The container/glassware must be empty.

DO NOT use an infectious waste bag to line a glassware box.

DO NOT over load glassware disposal containers.

DO NOT dispose of any of the following in glassware boxes:

- Needles
- Syringes with or without needles
- Any needles with attached tubing
- Any and all blades (scalpels, razor blades, X-acto knives)

You need this for sharps



Brandeis Safety Operating Guidelines



Title: Lachrymators (Eye Irritants)

Revision 00

Date 01/29/08

Pages 1 of 2

WHAT IS THE SCOPE OF THIS GUIDELINE?

This BSOP applies to all users of **lachrymators**, or chemicals that are strong eye irritants. Examples of lachrymators include: 2-Bromopropionyl chloride, Maleimide, Thionyl chloride, Thiophosgene, 4-Bromobenzyl bromide.

Lachrymators are chemicals that are strong eye irritants and cause tearing and burning sensations.

HOW DO I PROTECT MYSELF?

Eye Protection

Personnel handling lachrymators chemicals must wear adequate eye protection. Adequate safety glasses must meet the requirements of the Practice for Occupational and Educational Eye and Face Protection (ANSI Z.87. 1 1989) and must be equipped with side shields. Ordinary prescription glasses do not provide adequate protection unless they meet this standard and are marked as such. Safety glasses with side shields do not provide adequate protection from splashes; therefore, when the potential for splash hazard exists other eye protection and/or face protection must be worn (i.e. splash goggles or face shield).

Skin Protection

Gloves should be worn when handling these chemicals. Disposable nitrile gloves provide adequate protection against accidental hand contact with small quantities of most laboratory chemicals.

Appropriate protective clothing should be worn if the possibility of skin contact is likely. Open toe shoes are not appropriate when handling chemicals in a laboratory or in other areas where there is a potential for exposure.

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ENGINEERING/VENTILATION/ADMINISTRATIVE CONTROLS

ADMINISTRATIVE: Brandeis employees who work with hazardous chemicals must be apprised of the hazards of chemicals present in their work area. This training must be provided before initial assignment to a lab and distribution of keys or must work under supervision before training occurs. Lab personnel need to be trained on how lachrymators may react with other materials, the identity and location of lachrymators in the lab, the proper measure to handle and store them and measures to be used to clean up spills.

ENGINEERING CONTROLS:

Lachrymators should always be handled in a fume hood.

SPECIAL HANDLING AND/OR STORAGE REQUIREMENTS

Lachrymators should be stored in a cool and dry location. Keep tightly closed. Do not allow contact with water with some lachrymating chemicals (check MSDS). Avoid mixing or storing near oxidizers, alcohols, amines and strong bases.

HANDLING EMERGENCIES INVOLVING LACHRYMATORS

Anticipate emergency situations, have proper handling equipment in the lab and readily available for spills. Check the MSDS to determine what is appropriate. Spill control materials for lachrymators are designed to be inert and will not react with the reagent (i.e. dry lime, sand, soda ash).

In the event of a spill or adverse reaction notify lab personnel immediately that an incident has occurred. Do not attempt to handle a large spill/reaction/fire, or one in which you are not trained or equipped for. Turn off all ignition sources if this can be done safely, vacate the area and call for assistance. **The chemical should be in a fume hood, close the hood sash all the way if this can be done safely.**

Laboratory emergencies should be reported to the Public Safety Office at 63333. Public Safety will also contact the EH&S Office at 64262. Communicate the following:

- Location of spill/incident
- Type of material involved and quantity
- Injuries involved
- Fire/explosion
- Your location/contact information (or who to contact for further information)

Notify the PI or designated Safety Officer as soon as possible also.

WASTE DISPOSAL REQUIREMENTS

Contact the hazardous waste hotline at 62561 and leave a message including your name, location and question for waste containers and pick up.

DECONTAMINATION PROCEDURES

Wash hands and arms with soap and water immediately after handling any chemical.

Clean work areas carefully when done. Dispose of contaminated material in the hazardous waste storage container. Do not dispose of waste with incompatible material.



Brandeis Safety Operating Guidelines

Title: **Oxidizing Chemicals**

Revision 00

Date 12/27/07

Pages 1 of 2

WHAT IS THE SCOPE OF THIS GUIDELINE?

This BSOP applies to all users of oxidizing chemicals. Examples of oxidizers include: Ammonium perchlorate, Bromine, Chromic acid, Dibenzoyl peroxide, Hydrogen peroxide, Perchloric acid, Sodium perchlorate.

Oxidizing chemicals are materials that spontaneously evolve oxygen at room temperature or with slight heating or promote combustion. This class of chemicals includes peroxides, chlorates, perchlorates, nitrates, and permanganates. Strong oxidizers are capable of forming explosive mixtures when mixed with combustible, organic or easily oxidized materials.

HOW DO I PROTECT MYSELF?

Eye Protection

Personnel handling oxidizing chemicals must wear adequate eye protection. Adequate safety glasses must meet the requirements of the Practice for Occupational and Educational Eye and Face Protection (ANSI Z.87. 1 1989) and must be equipped with side shields. Ordinary prescription glasses do not provide adequate protection unless they meet this standard and are marked as such. Safety glasses with side shields do not provide adequate protection from splashes; therefore, when the potential for splash hazard exists other eye protection and/or face protection must be worn (i.e. splash goggles).

Skin Protection

Gloves should be worn when handling oxidizing chemicals. Disposable nitrile gloves provide adequate protection against accidental hand contact with small quantities of most laboratory chemicals.

Appropriate protective clothing should be worn if the possibility of skin contact is likely. Open toe shoes are not appropriate when handling chemicals in a laboratory or in other areas where there is a potential for exposure.

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ENGINEERING/VENTILATION/ADMINISTRATIVE CONTROLS

ADMINISTRATIVE: Brandeis employees who work with hazardous chemicals must be apprised of the hazards of chemicals present in their work area. This training must be provided before initial assignment to a lab and distribution of keys or must work under supervision before training occurs. Lab personnel need to be trained on how oxidizers react with other materials, the identity and location of oxidizers in the lab, the proper measure to handle and store oxidizers and measures to be used to clean up spills of oxidizers.

ENGINEERING CONTROLS:

The use of certain concentrations of perchloric acid must be performed in a fume hood equipped with wash down facilities.

The need for safety shielding should be reviewed and utilized any time there is a risk of explosion, splash hazard or a highly exothermic reaction. All manipulations of oxidizing chemicals, which pose this risk, should occur in a fume hood with the sash in the lowest feasible position (18" or less).

SPECIAL HANDLING AND/OR STORAGE REQUIREMENTS

Oxidizers should be stored in a cool and dry location. Segregate oxidizers from all other chemicals in the laboratory. Minimize the quantities of strong oxidizers stored in the laboratory.

DO NOT return excess chemicals to the original container. Impurities may be introduced into the container which may cause a fire, explosion or other unwanted event or contamination.

HANDLING EMERGENCIES INVOLVING OXIDIZING CHEMICALS

Anticipate emergency situations, have proper handling equipment in the lab and readily available for spills. Check the MSDS to determine what is appropriate. Spill control materials for oxidizers are designed to be inert and will not react with the reagent (i.e. Speedi dri).

In the event of a spill or adverse reaction notify lab personnel immediately that an incident has occurred. Do not attempt to handle a large spill/reaction/fire, or one in which you are not trained or equipped for. Turn off all ignition sources if this can be done safely, vacate the area and call for assistance.

Laboratory emergencies should be reported to the Public Safety Office at 63333.

Public Safety will also contact the EH&S Office at 64262. Communicate the following:

- Location of spill/incident
- Type of material involved and quantity
- Injuries involved
- Fire/explosion
- Your location/contact information (or who to contact for further information)

Notify the PI or designated Safety Officer as soon as possible also.

WASTE DISPOSAL REQUIREMENTS

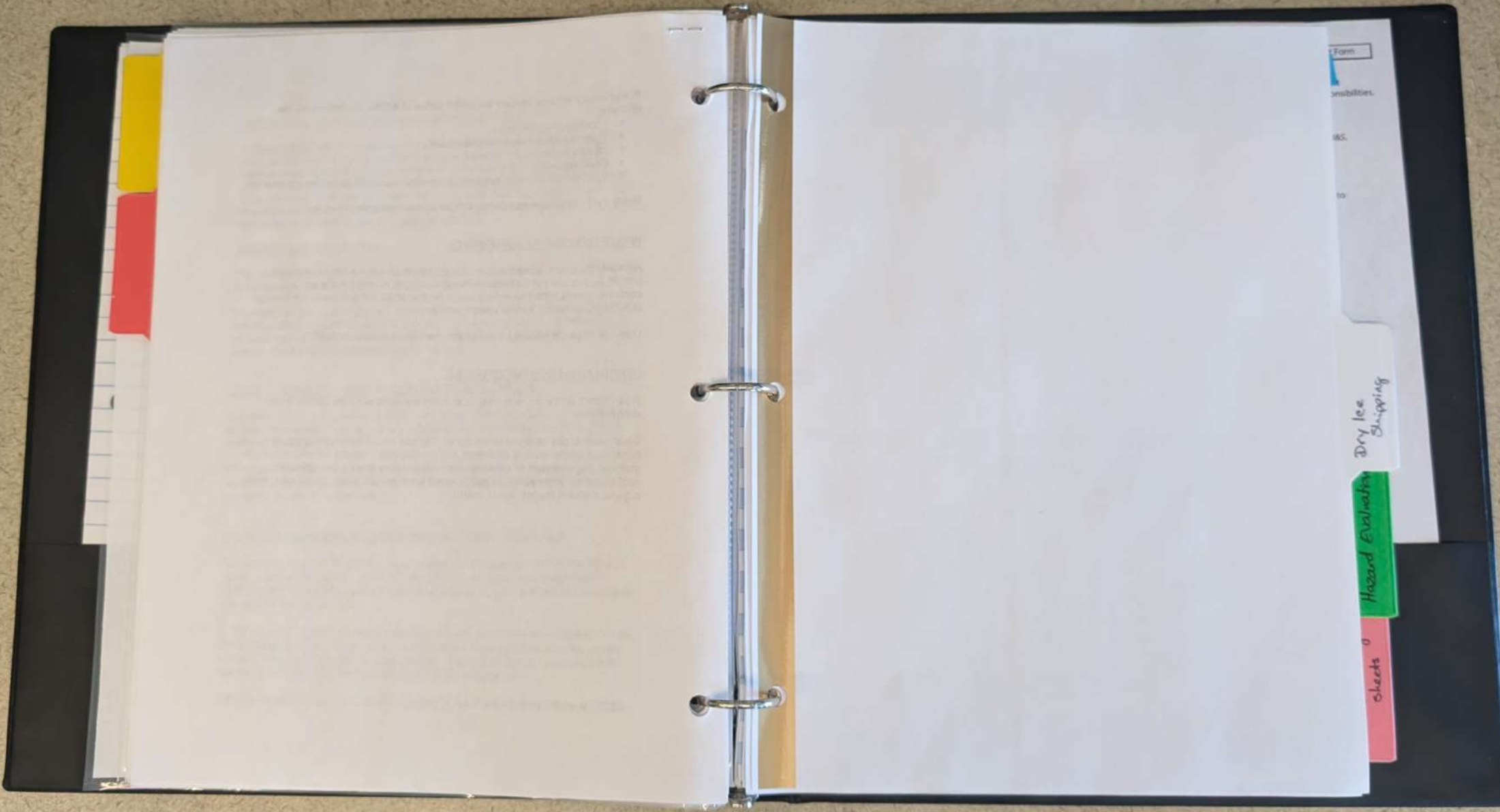
All materials contaminated with oxidizing chemicals pose a fire hazard and should be disposed of as hazardous waste. If you do not have a waste container, contact the hazardous waste hotline at 62561 and leave a message including your name, location and question.

Disposal requests should be called into the Waste Hotline at 62561.

DECONTAMINATION PROCEDURES

Wash hands and arms with soap and water immediately after handling any chemical.

Clean work areas carefully when done. Dispose of contaminated material in the hazardous waste storage container. Do not dispose of waste with incompatible material. Paper towels or other similar material may pose a fire risk when contaminated. Proceed with caution when working with oxidizers around other organic material (paper, wood, cloth).



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Brandeis University Guide to Shipping with Dry Ice

With appreciation and thanks to Andy Green,
University of New Hampshire, Office of Environmental Health and Safety,
for permission to use and modify this document.

Updated on
January 14, 2014

- proper left shipping
- boxes
- commercial invoice

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Reason:	10
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I. Introduction

The U.S. Department of Transportation (DOT) and the International Air Transport Association (IATA) regulate shipments of dry ice because it is a hazardous material. Specific procedures must be followed when packaging and shipping materials refrigerated with dry ice and a record of training must be kept.

Follow procedures outlined in this guide when your shipment includes *no hazardous materials other than dry ice*. If you are not sure if the material you are sending is considered hazardous, contact the Brandeis Safety Office or the Science Stockroom for additional information. See Section IV for specific shipping requirements.

Packages refrigerated with dry ice are normally shipped by air in order to reach their destinations rapidly. However, Brandeis University requires that the information in this guide be followed when shipping by any mode of transportation. The guidelines found in this manual will fulfill the IATA requirements for Packaging Instruction 904 for air transport.

II. Training Requirements

Federal rules require that anyone wishing to ship dry ice must first have **shipping training**. If you are going to package dry ice for shipment or sign any type of shipping documentation (such as a FedEx Airbill) for a dry ice shipment, you must follow the training certification requirements outlined below.

1. **Read this guide.** This guide will explain the general provisions relating to the regulations and detailed training in the requirements applicable to dry ice.
2. **Complete and submit to the BRANDEIS SAFETY OFFICE an Intent to Ship Dry Ice form** (Appendix A).

You must renew your certification every two years. Training sessions reviewing the material in this manual are available from the Safety Office and the manual will be made available electronically for refresher training.

III. Hazard Identification

Dry ice is classified by DOT and IATA as a "miscellaneous" hazard, class 9. Dry ice is considered hazardous during transportation for three reasons:

1. **Explosion hazard:** dry ice releases a large volume of carbon dioxide gas as it sublimates. If packaged in a container that does not allow for release of the gas, it may explode, causing personal injury or property damage. Packaging must allow for venting.
2. **Suffocation hazard:** a large volume of carbon dioxide gas emitted in a confined space may create an oxygen deficient atmosphere. Label the package properly to communicate the hazards.
3. **Contact hazard:** dry ice is a cryogenic material that causes severe frostbite upon contact with skin. Label the package properly to communicate the hazards.

IV. Packaging Dry Ice

A. Requirements

There are basic requirements for shipments of dry ice:

1. **Gas venting:** packages must allow for release of carbon dioxide gas. Dry ice must be sealed in a container with an airtight seal such as a jar with a threaded lid or a plastic cooler. Pack dry ice loosely in the outer package such as a Styrofoam shipping package. Check the *Manufacturers list* for prefabricated packaging.
2. **Package integrity:** a package containing dry ice must be of adequate strength for intended use. It must be strong enough to withstand the loading and unloading normally encountered in transport. It must also be constructed and closed in order to prevent any loss of contents that might be caused by vibration or by changes in temperature, humidity, or altitude. (See Figure 4)
3. **Package materials:** do not use plastics that can be rendered brittle or permeable by the temperature of dry ice. This problem can be avoided by using commercially available packages intended to contain dry ice, see *Appendix B, Manufacturers of Dry Ice Shipping Containers* (ex.: Saf-T-Pak STP 310 or Source Packaging INF-5000).
4. **Airbill:** the airbill (also referred to as the air waybill) must include the statement "Dry ice, 9, UN1845, number of packages X net weight in kilograms." FedEx has a check box on their airbill to satisfy this requirement; see Figure 2. Airborne Express requires a slightly different format; see Figure 3. Check with your courier to make sure you have made the proper notation on their paperwork.
5. **Marking the package:** The shipping container must be marked with the following (Place two labels, one on each opposite side of box):
 - a. "Carbon dioxide, solid" or "Dry Ice", UN1845 in this order and in English;
 - b. The FULL name and address of the shipper and consignee (where/who it is being shipped to);
 - c. The net quantity of dry ice within each package in kilograms.

(NOTE: The IATA label available in the Safety Office and the Science Stockroom would fulfill these requirements (5 & 6).)

6. **Labeling:** the outermost container must be labeled with a hazard class 9 label, UN 1845, and net weight of dry ice in kilograms. See Figure 1. A printable version is included in *Appendix C*. The label should be affixed to a vertical side of the box (not the top or bottom) and oriented as in Figure 1. The maximum allowable net quantity of dry ice allowed per package is 200 kg. *Special IATA Class 2 labels will also be available in the Safety Office and Science stockroom. Reminder: Place one of these labels on two opposing sides of the box.*



Figure 1. Dry ice label.

FedEx USA Airbill 639360283475 0200

For Express Package Service

1. Shipper's Declaration
☒ Dry Ice
☐ Cargo Aircraft Only

2. Your Internal Billing Reference

3. To
 Name
 Address
 City
 State
 ZIP

4. From
 Name
 Address
 City
 State
 ZIP

5. Package Description
 1 box containing 6 kg of dry ice

6. Weight
 6.0 kg

7. Payment due to
☒ Collect
☐ Prepaid

8. Special Handling
☒ Fragile
☐ Perishable
☐ Hazardous

9. Signature
 Shipper's Signature
 Date

10. Receiver's Signature
 Receiver's Signature
 Date

11. Return Address
 Name
 Address
 City
 State
 ZIP

12. Remarks

Try online shipping at fedex.com

Domestic? Visit our Web site at fedex.com

13. Tracking Number
 4446

Figure 2. FedEx Airbill. Highlighted area properly documents 1 box containing 6 kg of dry ice.

Airborne Express Airbill 2959950825

1. Shipper's Declaration
☒ Dry Ice
☐ Cargo Aircraft Only

2. Your Internal Billing Reference

3. To
 Name
 Address
 City
 State
 ZIP

4. From
 Name
 Address
 City
 State
 ZIP

5. Package Description
 1 box containing 5 kg of dry ice

6. Weight
 5.0 kg

7. Payment due to
☒ Collect
☐ Prepaid

8. Special Handling
☒ Fragile
☐ Perishable
☐ Hazardous

9. Signature
 Shipper's Signature
 Date

10. Receiver's Signature
 Receiver's Signature
 Date

11. Return Address
 Name
 Address
 City
 State
 ZIP

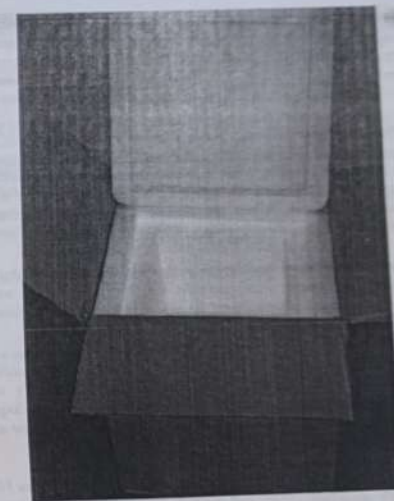
12. Remarks

Thank You for Shipping with Airborne!

AIRBORNE EXPRESS

Figure 3. Airborne Express Airbill. Highlighted area shows format required for 1 box containing 5 kg of dry ice.

Figure 4. Typical Dry Ice shipping container, internal foam area with cardboard box exterior. DO NOT tape the Styrofoam top or the box top on right. Taping should be secure but NOT air tight.



B. Recommendations

Note the following recommendations when packaging and labeling dry ice shipments:

- Do not write "specimens" or "diagnostic specimens" on the box. Diagnostic specimens are subject to specific packaging requirements and there should not be any misunderstanding about your shipment. Diagnostic specimens, in shipping terminology, are materials that may be infectious to humans or animals. If you think your samples might be infectious, contact the Brandeis Safety Officer.
- Reusing boxes. If you choose to reuse a box, completely obliterate all unnecessary marking such as hazard labels, addresses, FedEx (or other courier) labels and barcodes. Use caution if reusing a box that has been used to ship infectious material or diagnostic specimens. Only reuse a box if you can personally verify it is not contaminated and its integrity is intact. A box should not be reused if it is torn, cut, stained, or if the insulation is cracked or broken.
- Secure your inner package in such a way that when the dry ice sublimates, it will not move freely inside of the insulated box. You may want to wedge the package in place with cardboard or styrofoam. Fragile containers such as glass tubes or vials should be wrapped with cushioning material.
- Shipments are generally recommended to contain 5-10 pounds (2.27-4.54 kg) of dry ice per 24 hours. Refer to your package manufacturer's recommendations. Make arrangements with your consignee to make sure your package will be received on its intended delivery date. Take into account local holidays or closings that might delay package receipt.
- Dry ice shipments can be made with FedEx (Refer to FedEx *How to Pack* manual, pages 12-13) and DHL. UPS and the U.S. Postal Service have extremely restrictive policies concerning shipments of hazardous materials; do not ship dry ice with UPS or the U.S. Postal Service.

Appendix A. Intent to Ship Dry Ice

After reading the Brandeis University Guide to Shipping with Dry Ice, fill out this form to qualify to ship dry ice.

Why is dry ice considered a hazardous material?

Which of the following labels/markings must appear on a package containing dry ice? Check all that apply.

- | | |
|---|--|
| ☐ Class 9 hazard label | ☐ Net weight of dry ice |
| ☐ Class 8 hazard label | ☐ Dry ice, UN1845 |
| ☐ Inner packages comply with prescribed specifications | ☐ Biohazard symbol |
| | ☐ Diagnostic specimens |

I have to put a class 9 label on the box only when there are other hazardous materials in the box.

- a) True
b) False

It is acceptable to put a class 9 label on the top or bottom of the box.

- a) True
b) False

The only consideration when reusing a dry ice shipping box is labeling it with the correct address.

- a) True
b) False

If you are shipping non-hazardous plant tissue samples to a lab for diagnostic analysis, it is okay to write on the shipping box, "Diagnostic specimens enclosed."

- a) True
b) False

I understand the hazards associated with dry ice and the shipping requirements for dry ice, as outlined in this manual.

Print Name:	
Signature:	
Department:	Phone:
Date:	

Please return in campus mail to the Brandeis Safety Office, Kalman 21, MS 067

Appendix B. Manufacturers of Dry Ice Shipping Containers

Air Sea Atlanta
1234 Logan Circle
Atlanta, GA 30318
(888) 351-8600
<http://www.airseatlanta.com>

AB-Pak, Inc.
Corporate One West
1195 Washington Pike
Bridgeville, PA 15017
(800) 245-2283
<http://www.ab-pak.com>

CARGOPak Corporation
3215-A Wellington Court
Raleigh, NC 27615
(800) 266-0652
<http://www.cargopak.com>

DG Supplies, Inc.
5 Bostal Drive
Cranbury, NJ 08512
(800) 347-7879
<http://www.dgsupplies.com>

HAZMATPAC, Inc.
5301 Polk St., Bldg. 18
Houston, TX 77023
(800) 923-9123
<http://www.hazmatpac.com>

Inmark, Inc.
220 Fisk Drive S.W.
Atlanta, GA 30336-0309
(800) 646-6275
<http://www.inmarkinc.com>

Polyfoam Packers Corporation
2320 S. Foster Avenue
Wheeling, IL 60090
(888) 765-9362
<http://www.polyfoam.com>

SAFT-T-PAK, Inc.
10807-182 Street, Edmonton
Alberta, Canada, T5S 1J5
(800) 814-7484
<http://www.saftpak.com>

Source Packaging of New
England, Inc.
405 Kalvert Street
Warwick, RI 02886
(800) 200-0366
<http://www.sourcepak.com>

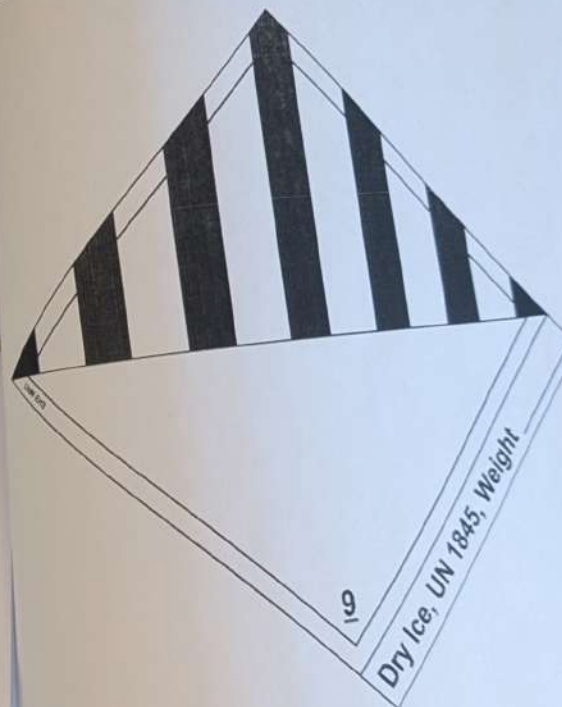
Package examples:

SAFT-T-PAK: STP 3100

Source Packaging: INF-5000

Appendix C. Dry Ice Shipping Label

The label below should print with the proper dimensions of a class 9 hazard label (minimum dimensions: 100 mm on a side). Cut around the outside border of the label and affix it a vertical side of the box (not the top or bottom), oriented as shown below. Many printer inks run when exposed to even small amounts of water, such as rain or snow. Therefore, when using this label, cover with clear plastic tape after filling in the weight of dry ice.



Appendix A. Intent to Ship Dry Ice

After reading the Brandeis University Guide to Shipping with Dry Ice, fill out this form to qualify to ship dry ice.

- 1) Why is dry ice considered a hazardous material?
It is an explosion hazard if not vented properly; a suffocation hazard in a confined space and a contact hazard (frostbite)
- 2) Which of the following labels/markings must appear on a package containing dry ice? Check all that apply.

☒ Class 9 hazard label
☐ Class 8 hazard label
☐ Inner packages comply with prescribed specifications

☒ Net weight of dry ice
☒ Dry ice, UN1845
☐ Biohazard symbol
☐ Diagnostic specimens
- 3) I have to put a class 9 label on the box only when there are other hazardous materials in the box.

a) True

b) False
- 4) It is acceptable to put a class 9 label on the top or bottom of the box.

a) True

b) False
- 5) The only consideration when reusing a dry ice shipping box is labeling it with the correct address.

a) True

b) False
- 6) If you are shipping non-hazardous plant tissue samples to a lab for diagnostic analysis, it is okay to write on the shipping box, "Diagnostic specimens enclosed."

a) True

b) False

I understand the hazards associated with dry ice and the shipping requirements for dry ice, as outlined in this manual.

Print Name:	Martha Reed		
Signature:	<i>M. Reed</i>		
Department:	Biology		
Date:	7/19/2012	Phone:	781-736-3124

Please return in campus mail to the Brandeis Safety Office, Kalman 21, MS 067

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Hazard Evaluation

Evaluation Log
Sheets



Partners
with
solutions

November
2013

Global Harmonization Training

Safety Completed:

Maitha	Emily	Eva 1/2
Leslie	Rita	
Alex	Bethany	
Stephen	Michelle	
Peter	Hana	
Paula	Elena	
Yusuke	Nate	
Chang	Seth Suid	
Trish	Will	
	Xiao	

Still need:

~~Nate~~ → Michael
Hana
Bethany
Elena
Yusuke
Will
Van
Xiao
Michelle
Seth
Rita
Van
Indira

800 356 4647

ohp.com

Brandeis University



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Harmonization 101
Sheets



BRANDEIS UNIVERSITY TRAINING LOG SHEET

Class/Meeting Title: Safety Mtg Date: 8/6/12
Content: General lab safety, Hazard list & see attached

Person performing training/meeting: Martha Reed

Print Name	Signature	Department	Status (Undergrad/Grad/ PostDoc)	Admin. Only*
Eugene Kim	<i>Eugene Kim</i>	Chem Biology	Grad	
Griffith	<i>Griffith</i>	Biology	Fac	
Peter Bronk	<i>Peter Bronk</i>	Biology	Post doc	
CHRIS VECSEY	<i>Chris Vecsey</i>	BIOLOGY/NEURO	PostDoc	
MARIA GENO	<i>Maria Geno</i>	BIOLOGY/NEURO	Grad	
Nate Dorehn	<i>Nate Dorehn</i>	Bio/Neuro	Post Doc	
CHANG LIU	<i>Chang Liu</i>	Biology / Neuro	Post Doc	
Lena Chen	<i>Lena Chen</i>	Biology / Biochemistry	Undergrad	
Katherine Parisky	<i>K. Parisky</i>	Biology	Researcher	
Paula Houghes	<i>Paula Houghes</i>	Biology	Grad.	

* A copy of this form must be sent to your Administrative Office. The Administrative Office must complete the last column to identify which individuals are employees by checking the box. The Admin Office should forward a completed copy to the Safety Office; Kalman, MS067.

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Evaluation Log
Sheets

2pm Lab Safety Mtg Rosensteel 118 7/18/2012

Responsibilities - Lab Safety Co-ordinator

check EHA's website for updates / safety

add lab safety procedures to this book

dry ice shipping / training - in book

Do lab hazard evaluation - 1X/year

- initial one ~~some~~ somewhere - where?

- go through with lab - use sign in sheet to document

annually

Trivariate audit of lab - yearly

tell lab that I coordinate with Andy

check cork board for mtgs etc

First aid supplies in hall - Andy

5m syringe - put in sharps/glass box

activated charcoal filter for EtBr soln - gel
buffer

lab safety manual - location

MSDS - on web

close containers when not in use

wash hands when leaving lab

never work alone with highly toxic/ reactive materials

no open toe or mesh footwear in labs

emergency shower / eye wash outside Leslie's office
fire extinguisher / alarm next to door at end of hall
first aid kit in hall at top of spiral stair

EtBr - run buffer through filter prior to pouring
down drain 3pt / 41.40 good for 10L each
do not put EtBr contam. materials in regular trash

Eye wash - flush eyes 15 min, if wearing contacts
flush 1 min, remove contacts, flush 15 min
if alkaline chemical - flush 30 min

Public Safety Office 6-3333
EH+S 6-4262

? acid/base spill kit?

If skin comes in contact with liq N₂ / dry ice,
run under lukewarm (not hot / cold) water 15

syringe disposal -

Date: 7/19/12	PIV Contact: Leslie Griffith / Heather Reed	
Bldg(s): SSC	Dept: Biology	Room(s): 206
Subgroup if applicable:		Phone: 6-3124

Chemical Hazards: Check all potential & applicable hazards in the Lab(s).

☐ Air reactive	☐ Lachrymator	☐ Specific target organ effects
☒ Allergens	☐ Neurotoxin	☒ Toxic (acute, highly or extremely toxic)
☐ Carcinogen	☒ Oxidizer, strong oxidizer	☐ Shock sensitive material
☐ Chemical burn potential	☒ Peroxide, peroxide forming comp.	☐ Water reactive
☒ Corrosive	☒ Poison	☐ Other hazards (identify)
☐ Explosive	☐ Pyrophoric	☒ Gas flame - burner burner
☒ Flammable	☒ Reproductive hazard	☒ Rhythmic - electrical
☐ Heavy metals (Ag, Pb, Cd, Cr, Hg)	☐ Sensitizers	☐

Physical & Equipment Hazards: Identify hazards and equipment.

☒ Machinery tools 12-21 Rebig center	☐ Vacuum, high pressure, sealed tubes
☐ High noise levels	☒ Cryogenics liq N ₂ - in lab occasionally
☒ Compressed gas cylinders	☐ General electrical hazards
☐ Magnetic hazard	☐ High voltage, high current
☒ Open flames (ex: Bunsen burners)	☒ High temperature, exothermic reactions heat plates
☐ Centrifuges	☐ Autoclaves
☐ Nonionizing radiation: ☐ microwave ☐ ultrasound	☒ ultraviolet ☐ infrared ☐ laser TC-100M
☐ Ionizing radiation: ☐ x-ray ☐ RAM ☐ Cobalt 60	

Health and Safety Requirements: Identify hazard controls utilized in the lab.

☒ safety glasses, type 287	☒ gloves, type latex, white	☒ respirator, type mask only
☐ face shield/other shielding	☐ earplugs/muffs	☒ protective clothing, type lab coats
☐ laser shielding	☒ local ventilation, type hood	☐ biosafety cabinet
☐ radiation badge	☐ warning signs, lights, alarms	☐ glove box
☐ decontamination needed	☒ ultraviolet light TC hood	☐ other
☐ biosafety level 1	☐ biosafety level 2	

Disposal Hazards & Procedures: Check waste you may be generating and disposal methods used.

☒ Ignitable (FP <140 F)	☒ Corrosive (pH <2 or >12.5)	☐ Reactive (water/air reactive)
☐ Toxic (Heavy metals)	☐ Radioactive waste	☒ Steam sterilization (autoclaving) outside room 3rd floor
☒ Sink Disposal	☒ Place in Hazardous waste container	☒ Bleach treatment
☒ Sharps disposal	☒ Glass Disposal	☒ Biohazard - Ecoli - put in bag with autoclave or bleach

Biological Hazards: YES _____ NO ☒

2/08 modified PPP

Copy to A.F. 1/24/08
update to A.F. 2/01/08

Date: 1/22/2008	PI/Contact: Leslie C. Griffith / Pat Panmester
Bldg(s): Bassine	Room(s): 415, 322, 337
Subgroup if applicable:	Phone: 63124 (Pat) 63123 (P.E. - hush)

Chemical Hazards: Check all potential & applicable hazards in the Lab(s)

☒ Air reactive <i>Ethen</i>	☐ Lachrymator	☐ Specific target organ effect(s)
☒ Allergens <i>322 Fly Br</i>	☐ Neurotoxin	☒ Toxic, acute, highly or extremely toxic
☒ Carcinogen	☒ Oxidizer, strong oxidizer	☐ Shock sensitive material
☐ Chemical burn potential	☒ Peroxide, peroxide forming compd.	☐ Water reactive
☒ Corrosive	☒ Poison	☐ Other hazards (identify)
☐ Explosive	☐ Pyrophoric	☒ Electrical - <i>high Res - many cords</i>
☒ Flammable	☒ Reproductive hazard	☒ <i>gas - biomass burners</i>
☒ Heavy metals (Ag, Pb, Cd, Cr, Hg, <i>thun</i>)	☐ Sensitizer, strong sensitizer	☐

Physical & Equipment Hazards: Identify hazards and equipment

☒ machinery/tools <i>J2-21 Refrig. Centrifuge</i>	☐ vacuum, high pressure, sealed tubes
☐ high noise levels	☒ cryogenics <i>(liq. N₂ in lab room + storage tank 310)</i>
☒ compressed gas cylinders	☐ high voltage, high current
☐ magnetic hazard	☐ high temperature, exothermic
☐ nonionizing radiation: ☐ microwave ☐ ultrasound	☒ ultraviolet ☐ infrared ☐ laser <i>*Tc. Rm 337</i>
☒ ionizing radiation: ☐ x-ray ☐ RAM ☐ Cobalt 60	<i>1160 Rm 415 * 32P (Rad)</i>

Health and Safety Requirements: Identify the controls utilized in the lab

☒ safety glasses, type <i>287 Reg.</i>	☒ gloves, type <i>latex, nitrile</i>	☒ respirator, type <i>mask only</i>
☐ face shield/other shielding	☒ earplugs/muffs <i>(sonicator)</i>	☒ protective clothing, type <i>lab coats</i>
☐ laser shielding	☒ local ventilation, type <i>hood</i>	☐ biosafety cabinet
☒ radiation badge	☒ warning signs, lights, alarms <i>(Rad)</i>	☐ Glove box
☒ decontamination needed <i>(Rad)</i>	☒ ultraviolet light <i>Tc hood 337</i>	☐ other
☐ biosafety level 1	☐ biosafety level 2	

Disposal Hazards & Procedures: Identify the waste and means of disposal.

☒ Ignitable (FP <140 F)	☒ Corrosive (pH <2 or >12.5)	☒ Reactive (water/air reactive) <i>(Other)</i>
☒ Toxic (Heavy metals)	☒ Radioactive waste	☒ Steam sterilization <i>(autoclave 105 min)</i>
☒ Spill Disposal <i>(check health & safety)</i>	☒ Place in Hazardous waste container	☐ Beach treatment
☒ Sharps disposal	☒ Glass Disposal	☒ Bacteria (<i>E. coli</i>) for preparation of plasmids & protein

Biological Hazards: YES _____ NO ☒

proper disposal of Big White; autoclave or bleach

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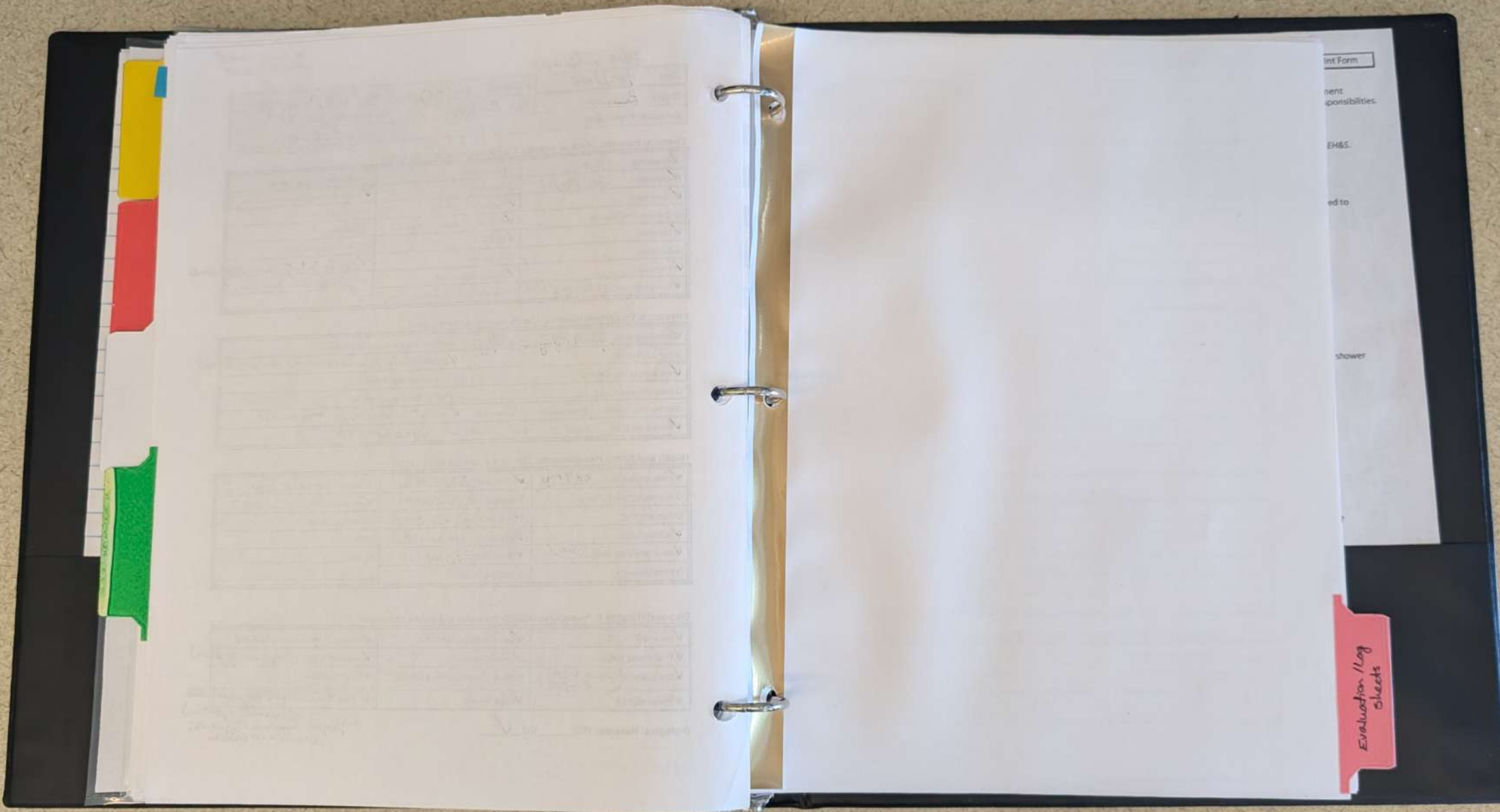
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Evaluation Log sheets



Print Form

Student Responsibilities:

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Evaluation / Log sheets

Date:	PI/Contact:	
Bldg(s):	Dept:	Room(s):
Subgroup if applicable:		Phone:

Chemical Hazards: Check all potential & applicable hazards in the Lab(s).

☐ Air reactive	☐ Lachrymator	☐ Specific target organ effects
☐ Allergens	☐ Neurotoxin	☐ Toxic (acute, highly or extremely toxic)
☐ Carcinogen	☐ Oxidizer, strong oxidizer	☐ Shock sensitive material
☐ Chemical burn potential	☐ Peroxide, peroxide forming compd.	☐ Water reactive
☐ Corrosive	☐ Poison	☐ Other hazards (identify)
☐ Explosive	☐ Pyrophoric	☐
☐ Flammable	☐ Reproductive hazard	☐
☐ Heavy metals (Ag, Pb, Cd, Cr, Hg)	☐ Sensitizers	☐

Physical & Equipment Hazards: Identify hazards and equipment.

☐ Machinery/tools	☐ Vacuum, high pressure, sealed tubes
☐ High noise levels	☐ Cryogenics
☐ Compressed gas cylinders	☐ General electrical hazards
☐ Magnetic hazard	☐ High voltage, high current
☐ Open flames (ex: Bunsen burners)	☐ High temperature, exothermic reactions
☐ Centrifuges	☐ Autoclaves
☐ Nonionizing radiation: ☐ microwave ☐ ultrasound ☐ ultraviolet ☐ infrared ☐ laser	
☐ Ionizing radiation: ☐ x-ray ☐ RAM ☐ Cobalt 60	

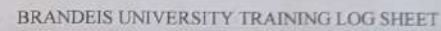
Health and Safety Requirements: Identify hazard controls utilized in the lab.

☐ safety glasses, type _____	☐ gloves, type _____	☐ respirator, type _____
☐ face shield/Other shielding	☐ earplugs/muffs	☐ protective clothing, type _____
☐ laser shielding	☐ local ventilation, type _____	☐ biosafety cabinet
☐ radiation badge	☐ warning signs, lights, alarms	☐ Glove box
☐ decontamination needed	☐ ultraviolet light	☐ other _____
☐ biosafety level 1	☐ biosafety level 2	

Disposal Hazards & Procedures: Check waste you may be generating and disposal methods used.

☐ Ignitable (FP <140 F)	☐ Corrosive (pH <2 or >12.5)	☐ Reactive (water/reactive)
☐ Toxic (Heavy metals)	☐ Radioactive waste	☐ Steam sterilization (autoclaving)
☐ Sink Disposal	☐ Place in Hazardous waste container	☐ Bleach treatment
☐ Sharps disposal	☐ Glass Disposal	☐

Biological Hazards: YES _____ NO _____

[illegible]

* A copy of this form must be sent to your Administrative Office. The Administrative Office must complete the last column to identify which individuals are employees by checking the box. The Admin Office should forward a completed copy to the Safety Office; Kalman, MS067.

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Print Forms

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Date:	PI/Contact:		
Bldg(s):	Dept:	Room(s):	
Subgroup, if applicable:		Phone:	

Chemical Hazards: Check all potential & applicable hazards in the Lab(s).

☐ Air reactive	☐ Lachrymator	☐ Specific target organ effect(s)
☐ Allergens	☐ Neurotoxin	☐ Toxics (acute, highly or extremely toxic)
☐ Carcinogen	☐ Oxidizer, strong oxidizer	☐ Shock sensitive material
☐ Chemical burn potential	☐ Peroxide, peroxide forming compd.	☐ Water reactive
☐ Corrosive	☐ Poison	☐ Other hazards (identify)
☐ Explosive	☐ Pyrophoric	☐
☐ Flammable	☐ Reproductive hazard	☐
☐ Heavy metals (Ag, Pb, Cd, Cr, Hg)	☐ Sensitizers	☐

Physical & Equipment Hazards: Identify hazards and equipment.

☐ Machinery/ tools	☐ Vacuum, high pressure, sealed tubes
☐ High noise levels	☐ Cryogenics
☐ Compressed gas cylinders	☐ General electrical hazards
☐ Magnetic hazard	☐ High voltage, high current
☐ Open flames (ex: Bunsen burners)	☐ High temperature, exothermic reactions
☐ Centrifuges	☐ Autoclaves
☐ nonionizing radiation: ☐ microwave ☐ ultrasound	☐ ultraviolet ☐ infrared ☐ laser
☐ Ionizing radiation: ☐ x-ray ☐ RAM ☐ Cobalt 60	

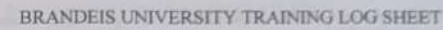
Health and Safety Requirements: Identify hazard controls utilized in the lab.

☐ safety glasses, type _____	☐ gloves, type _____	☐ respirator, type _____
☐ face shield/Other shielding	☐ earplugs/muffs	☐ protective clothing, type _____
☐ laser shielding	☐ local ventilation, type _____	☐ biosafety cabinet
☐ radiation badge	☐ warning signs, lights, alarms	☐ Glove box
☐ decontamination needed	☐ ultraviolet light	☐ other _____
☐ biosafety level 1	☐ biosafety level 2	

Disposal Hazards & Procedures: Check waste you may be generating and disposal methods used.

☐ Ignitable (FP <140 F)	☐ Corrosive (pH <2 or >12.5)	☐ Reactive (water/air reactive)
☐ Toxic (Heavy metals)	☐ Radioactive waste	☐ Steam sterilization (autoclaving)
☐ Sink Disposal	☐ Place in Hazardous waste container	☐ Bleach treatment
☐ Sharps disposal	☐ Glass Disposal	☐

Biological Hazards: YES _____ NO _____



Person performing training/meeting:

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Date:	PI/Contact:	
Bldg(s):	Dept:	Room(s):
Subgroup if applicable:		

Chemical Hazards: Check all potential & applicable hazards in the Lab(s).

☐ Air reactive	☐ Lachrymator	☐ Specific target organ effect(s)
☐ Allergens	☐ Neurotoxin	☐ Toxics (acute, highly or extremely toxic)
☐ Carcinogen	☐ Oxidizer, strong oxidizer	☐ Shock sensitive material
☐ Chemical burn potential	☐ Peroxide, peroxide forming compd.	☐ Water reactive
☐ Corrosive	☐ Poison	☐ Other hazards (identify)
☐ Explosive	☐ Pyrophoric	☐
☐ Flammable	☐ Reproductive hazard	☐
☐ Heavy metals (Ag, Pb, Cd, Cr, Hg)	☐ Sensitizers	☐

Physical & Equipment Hazards: Identify hazards and equipment.

☐ Machinery/ tools	☐ Vacuum, high pressure, sealed tubes
☐ High noise levels	☐ Cryogenics
☐ Compressed gas cylinders	☐ General electrical hazards
☐ Magnetic hazard	☐ High voltage, high current
☐ Open flames (ex. Bunsen burners)	☐ High temperature, exothermic reactions
☐ Centrifuges	☐ Autoclaves
☐ nonionizing radiation: ☐ microwave ☐ ultrasound ☐ ultraviolet ☐ infrared ☐ laser	
☐ ionizing radiation: ☐ x-ray ☐ RAM ☐ Cobalt 60	

Health and Safety Requirements: Identify hazard controls utilized in the lab.

☐ safety glasses, type	☐ gloves, type	☐ respirator, type
☐ face shield/Other shielding	☐ earplugs/muffs	☐ protective clothing, type
☐ laser shielding	☐ local ventilation, type	☐ biosafety cabinet
☐ radiation badge	☐ warning signs, lights, alarms	☐ Glove box
☐ decontamination needed	☐ ultraviolet light	☐ other
☐ biosafety level 1	☐ biosafety level 2	

Disposal Hazards & Procedures: Check waste you may be generating and disposal methods used.

☐ Ignitable (FP <140 F)	☐ Corrosive (pH <2 or >12.5)	☐ Reactive (water/air reactive)
☐ Toxic (Heavy metals)	☐ Radioactive waste	☐ Steam sterilization (autoclaving)
☐ Sink Disposal	☐ Place in Hazardous waste container	☐ Bleach treatment
☐ Sharps disposal	☐ Glass Disposal	☐

Biological Hazards: YES _____ NO _____

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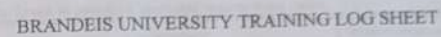
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Date:	PI/Contact:	
Bldg(s):	Dept:	Room(s):
Subgroup if applicable:		Phone:

Chemical Hazards: Check all potential & applicable hazards in the Lab(s)

☐ Air reactive	☐ Lachrymator	☐ Specific target organ effects
☐ Allergens	☐ Neurotoxin	☐ Toxics (acute, highly or extremely toxic)
☐ Carcinogen	☐ Oxidizer, strong oxidizer	☐ Shock sensitive material
☐ Chemical burn potential	☐ Peroxide, peroxide forming compd.	☐ Water reactive
☐ Corrosive	☐ Poison	☐ Other hazards (identify):
☐ Explosive	☐ Pyrophoric	☐
☐ Flammable	☐ Reproductive hazard	☐
☐ Heavy metals (Ag, Pb, Cd, Cr, Hg)	☐ Sensitizers	☐

Physical & Equipment Hazards: Identify hazards and equipment.

☐ Machinery/ tools	☐ Vacuum, high pressure, sealed tubes
☐ High noise levels	☐ Cryogenics
☐ Compressed gas cylinders	☐ General electrical hazards
☐ Magnetic hazard	☐ High voltage, high current
☐ Open flames (ex: Bunsen burners)	☐ High temperature, exothermic reactions
☐ Centrifuges	☐ Autoclaves
☐ Ionizing radiation: ☐ microwave ☐ ultrasound ☐ ultraviolet ☐ infrared ☐ laser	
☐ Ionizing radiation: ☐ x-ray ☐ RAM ☐ Cobalt 60	

Health and Safety Requirements: Identify hazard controls utilized in the lab.

☐ safety glasses, type _____	☐ gloves, type _____	☐ respirator, type _____
☐ face shield/Other shielding	☐ earplugs/muffs	☐ protective clothing, type _____
☐ laser shielding	☐ local ventilation, type _____	☐ biosafety cabinet
☐ radiation badge	☐ warning signs, lights, alarms	☐ Glove box
☐ decontamination needed	☐ ultraviolet light	☐ other _____
☐ biosafety level 1	☐ biosafety level 2	

Disposal Hazards & Procedures: Check waste you may be generating and disposal methods used.

☐ Ignitable (FP <140 F)	☐ Corrosive (pH <2 or >12.5)	☐ Reactive (water/air reactive)
☐ Toxic (Heavy metals)	☐ Radioactive waste	☐ Steam sterilization (autoclaving)
☐ Sink Disposal	☐ Place in Hazardous waste container	☐ Bleach treatment
☐ Sharps disposal	☐ Glass Disposal	☐

Biological Hazards: YES _____ NO _____



Person performing training/meeting:

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BRANDEIS UNIVERSITY EH&S DEPARTMENT
LAB MOVE-IN OR RELOCATION CHECKLIST

Print Form

Date _____
Name _____
Lab number/Bldg. _____

Welcome to your new lab. The Environmental Health and Safety Department is providing this checklist to assist in communicating your lab safety responsibilities. If you need assistance contact:
EH&S: Ext. 64262 afinn@brandeis.edu www.brandeis.edu/ehs
Facilities: Ext. 67579 rdonahue@brandeis.edu
Please complete the form, save a copy for your files and forward a copy to EH&S.

General Conditions

- ☐ Is updated emergency information posted on the lab door(s)?
- ☐ Has a chemical inventory been completed, a copy posted outside the lab, and an electronic copy sent to EH&S (Required to be updated every six months - Jan 1, July 1)?
- ☐ Have all lab personnel completed the on-line Boston Consortium training?
- ☐ Have you reviewed the Brandeis Chemical Hygiene Plan?
- ☐ A Lab Hazard Evaluation Form has been completed and reviewed with lab personnel and a Training Log completed?
- ☐ Have you maintained aisles in the lab at least 36" wide and egress doors are accessible (not blocked)?

Emergency Equipment

- ☐ Local fire extinguisher is unobstructed and has an inspection tag dated within the last 12 months?
- ☐ Eyewash stations in the area are unobstructed and have inspection tags dated within the last 12 months?
- ☐ Are safety showers in your area unobstructed and have inspection tags dated within the last 12 months? If no safety shower is a fire blanket located nearby?

Chemical Safety

- ☐ Chemicals are segregated by hazard class, stored safely and not adjacent to incompatibles?
- ☐ Are corrosives stored at or below waist level? (DO NOT store above eye level.)
- ☐ Compressed gases are properly secured?
- ☐ Lab personnel have been made aware of where and how to obtain material safety data sheets (MSDS)?
- ☐ A hazardous waste storage area has been properly established if needed?

Fume Hoods & Biosafety Cabinets

- ☐ Fume hoods and biosafety cabinets are working properly and have a recent face velocity and/or certification label?

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