

NYSBC Safety

GENERAL OVERVIEW VER. 2018



Laboratory Codes at NYSBC



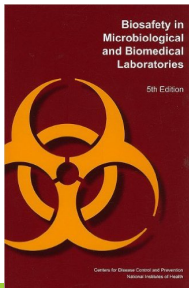
- 2014 NEW YORK CITY FIRE CODE
- C14 Certificate of Fitness (Supervising Chemical Lab)
 - Study material for C14 is a good source of information.



- NFPA 44 (Fire Protection for Laboratories)
- NFPA 55 (Compressed Gases and Cryogenics)



- OSHA Laboratory Standard (20 CFR 1910.1450)
 - Chemical Hygiene Plan
 - Plan for Hazard Communication
 - Safety equipment/Personal Protective Equipment



- Biosafety in Microbiological and Biomedical Labs
 - BSL1/BSL2

Chemical Hygiene Plan

Responsibilities under the CHP

- Lab heads/Lab Safety officer (LSO) /Staff

Standard Operating Procedures

- Dispensing liquid nitrogen

Control Measures

- Fume hoods/PPE

Record Keeping

- Chemical Inventory/Chemical labeling

Chemical Information

Emergency Procedures

Hazard Communication Plan

- Information sessions
- Communication of laboratory specific hazards as identified by laboratory head and LSO.
- Availability of SDS (MSDS)
- Location of SOPs

NYSBC Laboratory Hazards

Chemical Exposure



Cryogenics (burns and asphyxiation)

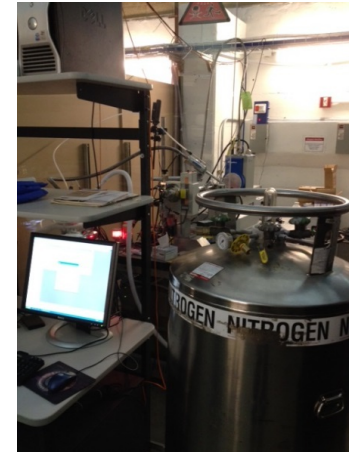


Both gas and liquid piped directly into the building.

High magnetic fields



X-rays



Cryogen Hazards

Nitrogen/Helium Hazards

Extremely cold cryogenic liquid/gas

- Brief exposure will freeze tissues; can cause frostbite or eye damage.
- Metal/Plastic/Rubber all become very brittle and may shatter
- Never use hammer or wrench to close a stuck valve.

Large change in volume upon vaporization

- Expands ~700 times (1 cu.ft. LN2 = 700 cu.ft. N2)
- Displaces oxygen and may cause asphyxiation

Can condense oxygen

- O2 has a higher boiling point than LN2
- Liquid oxygen is a strong oxidant and is highly reactive with organic materials

Oxygen Depletion

- ~21% - Normal O2 by volume
- 15 – 19 % - Impaired thinking and attention, increased pulse and respiration, reduced coordination, physical and intellectual performance
- 12 – 15 % - Poor judgment and coordination, abnormal fatigue, and emotionally upset.
- 10 – 12 % - Very poor judgment and coordination, impaired respiration, possibility of fainting, nausea and vomiting.
- <10 % - Loss of consciousness, convulsions, death within minutes.

O2 Monitors activate at 19.5% O2.

LN₂ Work - General

1. Liquid nitrogen is a cryogenic liquid and can cause severe frostbite. Always be cautious when working with it.
2. Liquid nitrogen can quickly displace oxygen in the room. Always work in a well ventilated area with an oxygen sensor.
3. If you are unsure of any procedure, consult with NYSBC staff.

High Magnetic Fields

Field Strength increases as R^3

The 5 Gauss field line
is safety guideline.

Metal Objects

- Ferrous/Steel Tools, etc.
- Gas cylinders/carts

Medical Implants

- Pace Makers

Magnetic Media

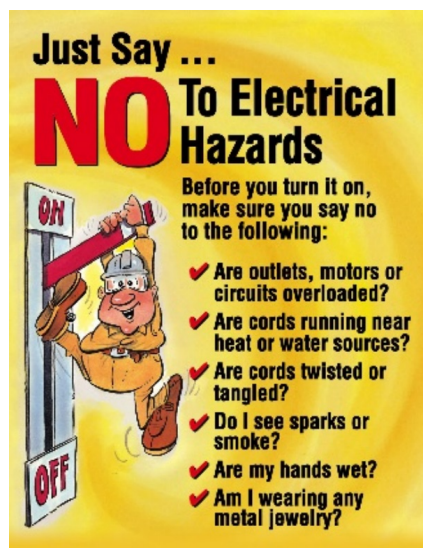
- Credit Cards/Metro cards



- Majority of the NMRs are in secure areas.
- 3 Areas where 5 G is generally assessable
 - 500 NMR on C1
 - 900#1 5G in phase 2
 - B1 storage area



NYSBC Laboratory Hazards



Sharps Containers



These 4 States

- ☐ Rushing
- ☐ Frustration
- ☐ Fatigue
- ☐ Complacency

can cause or contribute to

can influence or affect

Critical Errors

E.g., getting distracted, walking faster than is safe, losing your balance because your eyes or mind aren't on the task of walking.

Critical Decisions

E.g., wearing proper footwear, response to hazards, holding handrails, housekeeping habits

GHS

Globally Harmonized System of Classification and Labeling of Chemicals. (2015)

International approach to hazard communication. 9 pictograms.

Uniform criteria for the classification of chemical standards.

Standardized approach to labeling and MSDS.

Classification of Hazards



FLAME:

Flammables, Pyrophorics, self-heating, Emits flammable gas, etc.



FLAME OVER CIRCLE:

All classes of oxidizers



EXPLODING BOMB:

Explosives, self-reactive, Organic peroxides.



GAS CYLINDER:

Gases under pressure



CORROSION:

Acids and bases, skin Corrosion/burns, eye damage Corrosive to metal



ENVIRONMENTAL:

Aquatic toxicity



Skull & CROSSBONES:

Acute toxicity (fatal)



EXCLAMATION MARK:

Acute toxicity (harmful), Irritant, sensitizer, narcotic.



HEALTH HAZARD:

Carcinogenic, mutagenic, Target organ toxicity, etc.

MSDS >>> SDS

-
- | | |
|---|--|
| 1. Identification of the substance or mixture and of the supplier | 9. Physical and chemical properties |
| 2. Hazard identification | 10. Stability and reactivity |
| 3. Composition/information on ingredients Substance/Mixture | 11. Toxicological |
| 4. First aid measures | 12. <i>Ecological information</i> |
| 5. Firefighting measures | 13. <i>Disposal considerations</i> |
| 6. Accidental release measures | 14. <i>Transport information</i> |
| 7. Handling and storage | 15. <i>Regulatory information</i> |
| 8. Exposure controls/personal protection | 16. Other information including information on preparation and revision of the SDS |
- 

Label Requirements

NFPA Diamond

The Basic Parts of A GHS-Compliant Label

1 → **n-Propyl Alcohol**

UN No. 1274
CAS No. 71-23-8

2 → **DANGER**

3 → Highly flammable liquid and vapor. Causes serious eye damage. May cause drowsiness and dizziness.

4 → Keep away from heat/sparks/open flames/hot surfaces. No smoking. Avoid breathing fumes/mist/vapours/spray. Wear protective gloves/protective clothing/eye protection/face protection. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present. Continue rinsing.

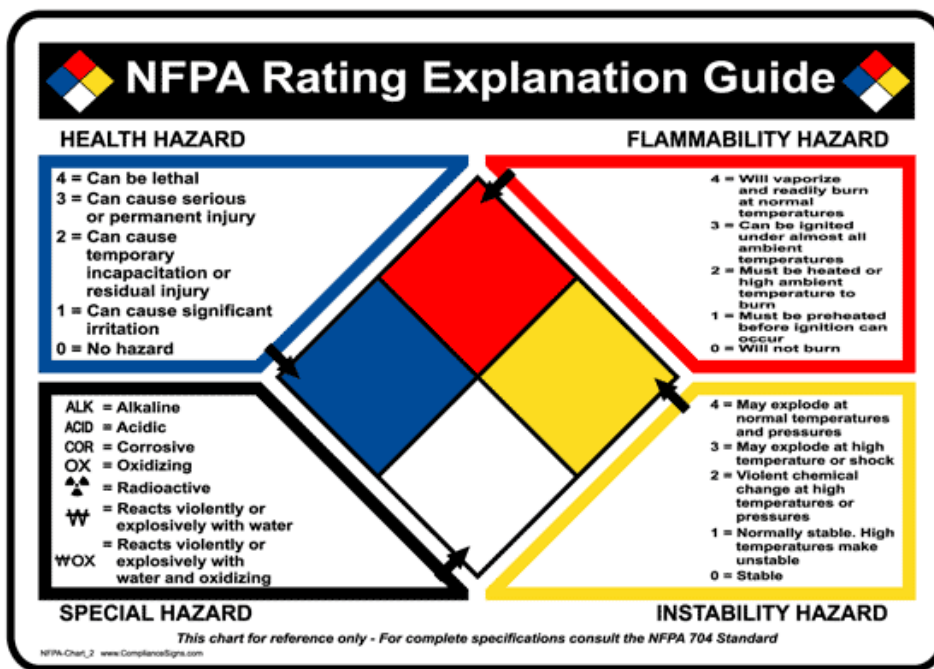
Fill Weight: 18.65 lbs. Lot Number: B56754434
Gross Weight: 20 lbs. Fill Date: 6/21/2013
Expiration Date: 6/21/2020 See SDS for further information.

5 → Acme Chemical Company • 711 Roadrunner St. • Chicago, IL 60601 USA • www.acmechem.com • 123-444-5567

6 → 

- Product Identifier** - Should match the product identifier on the Safety Data Sheet.
- Signal Word** - Either use "Danger" (severe) or "Warning" (less severe)
- Hazard Statements** - A phrase assigned to a hazard class that describes the nature of the product's hazards
- Precautionary Statements** - Describes recommended measures to minimize or prevent adverse effects resulting from exposure.
- Supplier Identification** - The name, address and telephone number of the manufacturer or supplier.
- Pictograms** - Graphical symbols intended to convey specific hazard information visually.

Sample label courtesy of Weber Packaging Solutions • www.weberpackaging.com



Chemical Protocols

Order minimally necessary amounts of chemicals

- < 15 gallons of flammable liquids including waste

Chemical inventory

- Updated twice annually

Date containers upon arrival

- Peroxide forming chemicals

File new SDS

Secondary container labeling

- Clearly labeled with name or acceptable abbreviation

Proper storage locations

- Appropriate cabinets/separate reactive chemicals

Waste disposal



Safety Measures

Engineering Controls

- HVAC/Fume Hood
- Flammable/Acid/Base/Toxic cabinets
- Flammables refrigerators

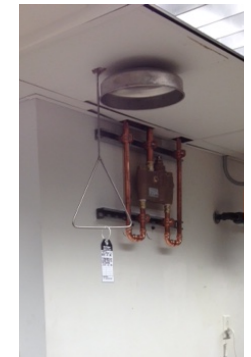
Personal Protective Equipment

- Safety glasses/goggles/face shields
- Lab coats
- Gloves
- Closed toe shoes

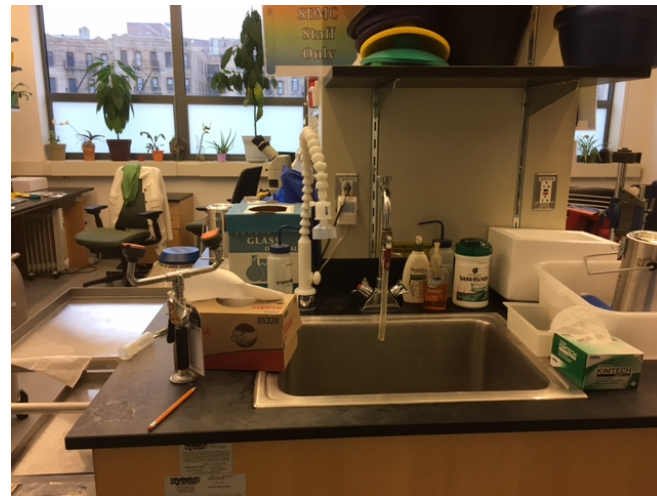
Safety equipment

- Eye wash & safety showers
- O2 monitors
- Fire extinguishers
- First aid kits

Good laboratory practices



Eyewash Stations



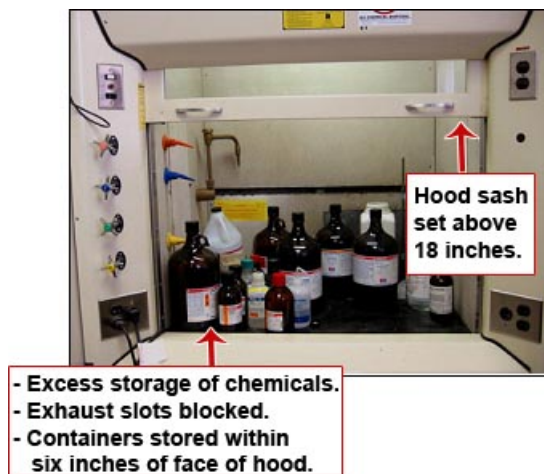
Fume Hoods

Fume hood SOP

Work away from the edge with sash lowered to appropriate height.

Should be kept clean, neat and free of clutter.

Are works spaces not storage locations.



Good Laboratory Practices

No eating or drinking

No smoking

No application of cosmetics

No storage of food in lab refrigerator/freezers

General housekeeping

Egress paths should be kept clear

Keeps spaces around safety equipment free & clear

Don't taste/inhale chemicals

Transports hazardous chemicals in secondary containers

When diluting concentrated acids/bases add TO water

When working with a new chemical become familiar with SDS

Good Laboratory Practices

Secure gas cylinders

Transport gas cylinders with caps using appropriate carts

Do not ride with gas cylinders in elevator

Walk at a speed that keeps the cylinder under control



Compressed gas tanks

Close the tank valves when done!



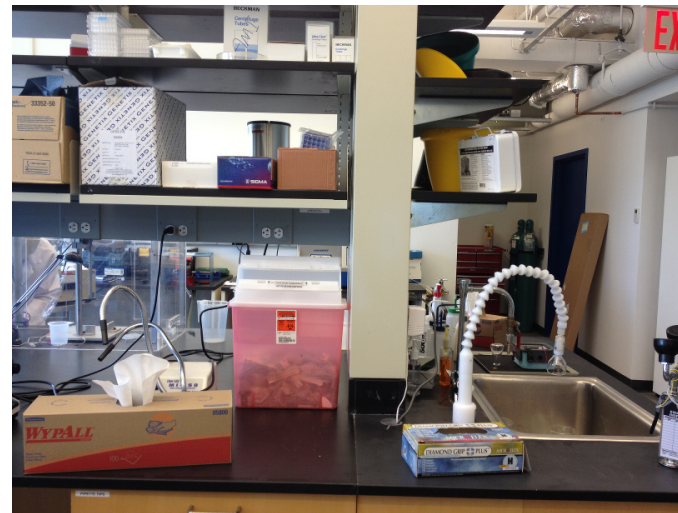
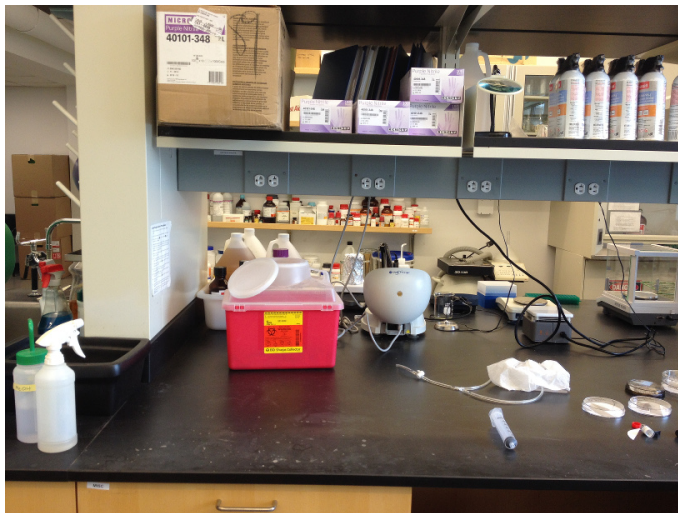
Waste Disposal

- Lab Sinks
 - Neutralization traps
 - Buffers, non-hazardous ---OK
 - No organic solvents
 - When in doubt – treat as hazardous
- Hazardous Waste
 - Collection areas
 - Labeled with date and %s
- Bio-Hazard Boxes
 - Culture plates, etc.
 - Serological pipettes
 - Gloves
 - Sharps boxes
 - Anything that might look like medical waste.
- Solvent bottles
 - Rinsed 3 times, collected as waste
 - Deface label
 - Recycle
- Recycling
 - Paper
 - Glass & Plastic
 - Rinsed bottles
 - Tip boxes, etc....
- Electronic Waste
 - Computers/Monitors
 - Instrumentation
 - Cleaned/Samples removed

Broken Glass, Lab Waste



Sharps



Biosafety levels

Table 2. Summary of Recommended Biosafety Levels for Infectious Agents

NCCAT is BSL-1

BSL	Agents	Practices	Primary Barriers and Safety Equipment	Facilities (Secondary Barriers)
1	Not known to consistently cause diseases in healthy adults	Standard microbiological practices	■ No primary barriers required. ■ PPE: laboratory coats and gloves; eye, face protection, as needed	Laboratory bench and sink required
2	■ Agents associated with human disease ■ Routes of transmission include percutaneous injury, ingestion, mucous membrane exposure	BSL-1 practice plus: ■ Limited access ■ Biohazard warning signs ■ "Sharps" precautions ■ Biosafety manual defining any needed waste decontamination or medical surveillance policies	Primary barriers: ■ BSCs or other physical containment devices used for all manipulations of agents that cause splashes or aerosols of infectious materials ■ PPE: Laboratory coats, gloves, face and eye protection, as needed	BSL-1 plus: ■ Autoclave available
3	Indigenous or exotic agents that may cause serious or potentially lethal disease through the inhalation route of exposure	BSL-2 practice plus: ■ Controlled access ■ Decontamination of all waste ■ Decontamination of laboratory clothing before laundering	Primary barriers: ■ BSCs or other physical containment devices used for all open manipulations of agents ■ PPE: Protective laboratory clothing, gloves, face, eye and respiratory protection, as needed	BSL-2 plus: ■ Physical separation from access corridors ■ Self-closing, double-door access ■ Exhausted air not recirculated ■ Negative airflow into laboratory ■ Entry through airlock or anteroom ■ Hand washing sink near laboratory exit
4	■ Dangerous/exotic agents which post high individual risk of aerosol-transmitted laboratory infections that are frequently fatal, for which there are no vaccines or treatments ■ Agents with a close or identical antigenic relationship to an agent requiring BSL-4 until data are available to redesignate the level ■ Related agents with unknown risk of transmission	BSL-3 practices plus: ■ Clothing change before entering ■ Shower on exit ■ All material decontaminated on exit from facility	Primary barriers: ■ All procedures conducted in Class III BSCs or Class I or II BSCs in combination with full-body, air-supplied, positive pressure suit	BSL-3 plus: ■ Separate building or isolated zone ■ Dedicated supply and exhaust, vacuum, and decontamination systems ■ Other requirements outlined in the text

Biosafety

NYSBC is approved for Biosafety Level I experiments

- Agents with no known or minimal potential hazard to lab workers

Any Biohazardous exposed equipment (e.g. thawed cryogrids) must be decontaminated

- Cryo-rescue grid, then place in freshly made (daily) 10% solution of bleach/water (Chlorox) for 30 minutes

Security

NYSBC maintains a Guard presence 24/7.

The building has both public and secure areas.

The building perimeter security is monitored by ADT Security.

NYSBC operates a surveillance system.

You always need to sign in and sign out

Do Not open an exterior door other than the main entrance, except in the case of fire.

Do Not block/disable any security or fire detection device.

Do Not hesitate to call the police if you have concerns of unauthorized persons in or around the building.

Access

Entrance and Egress are permitted only at the Main Entrance.

Sign-in and Sign-out in log-book.

If for some reason you are not on the list, respect the guard and contact EM staff to work out problem.

Human Safety

Two or more people must be present for All-hours operation.

Guard should be present 24/7

- In case of the Guard's absence....
- Single All-hours users are Not Permitted.
- Contact the NYSBC on-call staff member.
- Remain at the Guard's desk.

Guards will make periodic observations of building occupants

Human Safety

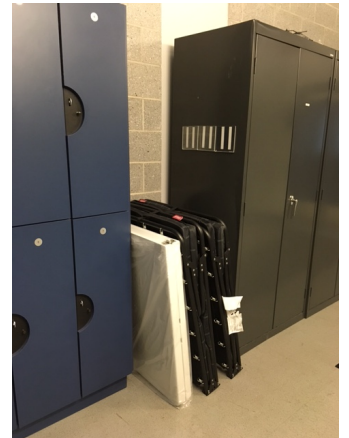
The following activities are NOT PERMITTED.

- Transfer of Liquid Helium or Nitrogen.
- Movement of gas cylinders within secure areas.
- Operation of circuit breakers.
- Access machine, electrical switch gear, or telephone room areas.

Visitors are Not Permitted during off-hours.

All-hours users are limited to working in the building to less than 36hrs in a single stretch.

If you need to take a rest, cots are available and can be set up in the control room.



Emergency Contacts

The Guard will have a list of contact information for NYSBC on-call personnel.

From any NYSBC phone, 9-911

Hospitals

- St. Lukes, 113th st. & Amsterdam.
- New York Presbyterian, 168th st. & Broadway.

Fire Alarm System

Monitored 24/7

Consists of smoke/fire detectors and manual pull stations.

There are no overhead sprinklers by design.

Fire stand pipe/hoses are intended for the Fire department use.

All fire extinguishers are CO₂ in aluminum canisters.

Activation of Fire Alarm

Evacuate Building

Report to Guard at location near the main entrance.

Contact NYSBC on-call personnel.



Notes:

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