

REQUIREMENTS FOR HIGHLY HAZARDOUS CHEMICALS

The purpose of this policy is to designate highly hazardous chemicals that may be used in research so that proper storage, use and handling procedures can be developed and implemented when working with these highly hazardous chemicals. The paragraphs below define the highly hazardous chemicals, and this determination is based on the unique physical or toxicological properties of these compounds. Additional precautions are necessary when using, handling, storing, or disposing of these chemicals in order to maintain the optimum level of safety for laboratory and building personnel.

A risk assessment must be completed by the Harvard Institutes of Medicine (HIM)/New Research Building (NRB) Environmental Health and Safety (EH&S) Office, in conjunction with the research personnel, prior to working with the designated chemicals in Groups 2 and 3. The risk assessment will evaluate how the chemical is being used in the laboratory setting and determine what, if any additional engineering controls, personal protective equipment, and/or administrative controls are necessary to control the hazard(s) associated with these chemicals.

Chemicals listed in Group 1 require specific EH&S guidelines, which have been or will be developed by the HIM/NRB EH&S Office. Researchers working with these chemicals are required to review and be trained on the corresponding guidelines prior to use.

NOTE: These lists are not exhaustive.

HIGHLY HAZARDOUS DESIGNATION

If a researcher reviews a Material Safety Data Sheet (MSDS) for a chemical and determines that it requires special precautions (e.g., respirator, localized exhaust) or has highly hazardous properties (e.g. highly toxic, air reactive, chronic health hazard) when working with the chemical, (s)he must notify the HIM/NRB EH&S Office. This notification also applies if a chemical has a rating of 4 in one of the National Fire Protection Association (NFPA) or the Hazardous Materials Information System (HMIS) hazard categories, since this rating indicates that the chemical is considered a highly hazardous chemical and as a result, it is covered by this Policy.

GROUP 1

EH&S guidelines must be followed when using these chemicals. Certain chemicals require air monitoring to ensure exposure is to low levels while others need proper training from the laboratory. Training may also be available via a 1 page fact sheet, this training is not all inclusive; laboratories need to ensure their processes are safe.

- Alkali Metals, (sodium, potassium, etc.)
- Anesthetic Gases
- Azides (sodium azide, etc.)
- Carcinogens (known or suspected, not otherwise referenced in this list)
- Chromium Hexavalent compounds
- Cyanides (potassium, sodium, etc.)
- Diaminobenzidine (DAB)
- Dimethylbenzanthracene (DMBA)
- Ethidium Bromide
- Formaldehyde
- Mercury Compounds
- Nitric Acid with a concentration > 40%
- Organic Peroxides
- Osmium Tetroxide
- Oxidizing Gases
- Peroxide Formers (ether, 1,4 – dioxane, tetrahydrofuran, etc.)
- Perchloric Acid
- O - Phenylenediamine (OPD)
- Phenol
- Picrylsulfonic Acid
- Sulfuric Acid with a concentration <97%
- Tamoxifen
- Taxol
- Titanium Tetrachloride
- Water Reactive Chemicals

GROUP 2

These chemicals require notification to the HIM/NRB EH&S Office when possessed and **prior to usage:**

- ALL Cholinesterase Inhibitors that are not included in Group 1
- Flammable Gases
- Fuming Nitric Acid, Sulfuric Acid, Hydrochloric Acid
- Hydrofluoric Acid
- Kainic Acid
- Known Carcinogens (Report of Carcinogens by Department of Health and Human Services: <http://ntp.niehs.nih.gov/?objectid=72016262-BDB7-CEBA-FA60E922B18C2540>)
- N-ethyl-N-nitrosourea (ENU)
- Organo-Mercury Compounds
- Phorbol Compounds

GROUP 3

These chemicals require approval from the HIM/NRB EH&S Office prior to ordering or purchasing. In addition, researchers working with these chemicals will require additional training on how to work with these chemicals.

Select Agents—Here is a list of common select agents used in a research setting. For a complete list of select agents, go to the following link:

http://www.selectagents.gov/resources/List%20of%20Select%20Agents%20and%20Toxins_111708.pdf

- Botulinum Toxin
- Conotoxin
- Ricin
- Saxitoxin
- Staph Enterotoxins
- Tetrodotoxin

Chemicals:

- Chlorine Gas
- Dioxins (e.g. 2,3,7,8-tetrachlorodibenzodioxin (TCDD))
- Highly toxic (e.g. Nickel Carbonyl)
- Mustard Gas
- Nerve Agents (e.g. Sarin, soman, tabun, VX)
- Neurotoxins (e.g., Dimethyl Mercury, 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP), 1-methyl-4-phenylpyridinium (MPP+))
- Poisonous Gases
- Pyrophorics (a.k.a. Air Reactive Chemicals) (e.g., tert-butyl lithium)

REQUIREMENT MATRIX

The following matrix outlines the requirements for each group:

Group	Risk Assessment	SOP/Guideline Development	SOP/Guideline Training
Group 3	Prior to Ordering or Purchasing	Prior to Ordering or Purchasing	Prior to Ordering or Purchasing
Group 2	Prior to Use	Prior to Use	Prior to Use
Group 1	Not Applicable	Not Applicable	Prior to Use

If you have any questions regarding this documents, please contact the HIM/NRB EH&S Office at 617-432-2762.