2021 MIT CHP Template Updates

2021 template and this document can be found here

https://ehs.mit.edu/chemical-safety-program/chemical-hygiene/

P. 12 Part 1

4.3 Guidance and resources for COVID-19 response

New Wording

Find the latest Institute COVID-19 related information at: https://now.mit.edu/

Old Wording

Find the latest Institute information can be found at:

A. Faculty and Researchers https://covid19.mit.edu/faculty-researchers
B. MIT Medical https://medical.mit.edu/covid-19-updates
C. Environment Health and Safety office https://ehs.mit.edu/about/ehs-covid-19-faq/
D. MIT's COVID-19 information center https://covid19.mit.edu/

P. 19 Part II (New section)

2.8 Green Chemistry

New Wording

Green Chemistry is the utilization of a set of principles that reduces or eliminates the use or generation of hazardous substances in the design, manufacture, and application of chemical products. Use the 12 Principles of Green Chemistry to design or modify experiment to make it more environmentally friendly and sustainable. Consider waste and hazard prevention during design, rather than disposing, treating and handling waste after a processor material has been developed. For more information on Green Chemistry and the 12 Principles, visit the EHS Office website at https://ehs.mit.edu/green-chemistry/.

12 Principles of Green Chemistry:

1. **Prevent waste**: Design chemical syntheses to prevent waste. Leave no waste to treat or clean up.
2. **Maximize atom economy**: Design syntheses so that the final product contains the maximum proportion of the starting materials. Waste few or no atoms.
3. **Design less hazardous chemical syntheses**: Design syntheses to use and generate substances with little or no toxicity to either humans or the environment.
4. **Design safer chemicals and products**: Design chemical products that are fully effective yet have little or no toxicity.
5. **Use safer solvents and reaction conditions**: Avoid using solvents, separation agents, or other auxiliary chemicals. If you must use these chemicals, use safer ones.
6. **Increase energy efficiency**: Run chemical reactions at room temperature and pressure whenever possible.
7. **Use renewable feedstocks**: Use starting materials (also known as feedstocks) that are renewable rather than depletable. The source of renewable feedstocks is often

agricultural products or the wastes of other processes; the source of depletable feedstocks is often fossil fuels (petroleum, natural gas, or coal) or mining operations.

8. **Avoid chemical derivatives**: Avoid using blocking or protecting groups or any temporary modifications if possible. Derivatives use additional reagents and generate waste.
9. **Use catalysts, not stoichiometric reagents**: Minimize waste by using catalytic reactions. Catalysts are effective in small amounts and can carry out a single reaction many times. They are preferable to stoichiometric reagents, which are used in excess and carry out a reaction only once.
10. **Design chemicals and products to degrade after use**: Design chemical products to break down to innocuous substances after use so that they do not accumulate in the environment.
11. **Analyze in real time to prevent pollution**: Include in-process, real-time monitoring and control during syntheses to minimize or eliminate the formation of byproducts.
12. **Minimize the potential for accidents**: Design chemicals and their physical forms (solid, liquid, or gas) to minimize the potential for chemical accidents including explosions, fires, and releases to the environment.

P. 21 Part II

3.1. Preliminary Steps and Procedures

Step 1: Determine the toxicity and warning properties of the chemicals to be used in your experiment.

New Wording

Consider substituting less toxic chemicals. Find the resources for greener chemical alternatives at the EHS Office website https://ehs.mit.edu/green-chemistry/.

Old Wording

Consider substituting less toxic chemicals

P. 22 Part II

3.1. Preliminary Steps and Procedures

Step 3B: Personal Protective Equipment for Eyes and Skin

New Wording

Never wear open toe or open heel shoes such as flip-flops, sandals, clogs or Crocs. High heeled shoes or flats should not be worn in the lab. Shoes made of porous material provide only limited protection in a spill and should be avoided. Wear clothing that fully covers your legs and arms when handling hazardous chemicals. As noted in 4.1 below: At a minimum, a laboratory coat or equivalent protective clothing of appropriate material is required for work with hazardous chemicals, unsealed radioactive materials, and biological agents at BL2 or greater (see https://ehs.mit.edu/workplace-safety-program/personal-protective-equipment/).

Old Wording

No flip-flops, sandals, or open-toed shoes. Wear clothing that fully covers your legs and arms when handling hazardous chemicals. As noted in 4.1 below: “At a minimum, a laboratory coat or equivalent protective clothing is required for work with hazardous chemicals, unsealed radioactive materials, and biological agents at BL2 or greater.”

P. 25 Part II

3.2.2 Attend to housekeeping by establishing and following routine cleaning procedures as part of the work you do.

New Wording

- Maintain ready access to exits, safety equipment such as fire extinguishers, eyewashes, and safety showers and electrical panels. Do not store materials in a way that will block access to exits, safety equipment or electrical panels. Maintain a clearance of 36 inches in bays inside the lab and 44 inches in the building corridors.
- Ensure all compressed gas tanks are properly secured to walls or benches.
- Chemical storage refrigerators should be defrosted periodically and should not be overcrowded.
- Utilize proper cord management techniques so that cords do not get damaged or become tripping hazards.

Old Wording

- Maintain ready access to exits and safety equipment such as fire extinguishers, eyewashes, and safety showers. Do not store materials in a way that will block access to exits or safety equipment.
- Ensure all compressed gas tanks are properly secured to walls or benches.
- Chemical storage refrigerators should be defrosted periodically and should not be overcrowded.

P. 32 Part II

3.5 Special Precautions for Work with Hydrofluoric Acid

New Wording

Any suspected skin exposures to HF should be immediately flooded with water, decontaminated with calcium gluconate gel, and be treated at MIT Medical.

In case of:

- Large area of skin exposure (greater than the palm of the hand) and the HF concentration is greater than 5%
- Eye exposure
- Inhalation exposure
- Ingestion

Immediately call 100 or 617-253-1212, ask for Advanced Life Support (ALS) Ambulance, follow appropriate irrigation protocol and go directly to the hospital.

Old Wording

Any suspected exposure to HF should be immediately flooded with water, decontaminated with calcium gluconate gel, and treated at MIT Medical.

P. 33 Part II

3.7 Special Precautions for Work with Nanomaterials

New Wording

EHS has developed a web course, Nanomaterials Safety and Health (MIT Atlas Learning Center – requires certificates), which includes information on the toxicity of different types of nanomaterials and laboratory practices to prevent exposures. Currently, nanoparticles and solutions containing them are being disposed of as hazardous waste. Please call the EHS Office at 617-452-3477 for exposure evaluation of experimental setups and additional information.

Old Wording

Currently, nanoparticles and solutions containing them are being disposed of as hazardous waste. Please call the EHS Office at 617-253-0344 for exposure evaluation of experimental setups and additional information.

P. 38 Part II (New section)

New Wording

5.4 Electrical Safety and Lockout/tagout Considerations

Electricity can be an invisible hazard if not handled appropriately. The hazard level increases as failures to follow electrical safety practices increase. Below are some considerations that will help protect yourself and others when working with electricity.

- Monitor equipment loads so that electrical circuits do not trip.
  - Do not daisy chain extension cords and power strips
  - High amperage or heat producing equipment (ovens, refrigerators, hot plates, heaters, etc.) shall be plugged directly into a wall outlet and not into a power strip or extension cord.

- Purchase equipment that is listed or labelled by a Nationally Recognized Testing Lab (NRTL). Visit this site for a list of all the current NRTLs.

- Contact EHS for assistance reviewing any modified or researcher build lab equipment. More complicated equipment may require an external consultant to assist with this review.

- When working on equipment maintenance or removing guards, control of any hazardous energies is essential for personnel safety. Follow OSHA 1910.147 requirements for locking and tagging of these energy sources. There are three main components to a successful program;
  - Training for authorized and affected personnel
  - Written Energy Control Procedures (ECPs)
  - Periodic Program Inspection

- When all energy sources cannot be isolated from equipment by unplugging during maintenance or other activities, lab personnel should contact DOF to have the electrical or other source of energy/pressure be mitigated and locked out by DOF.

- The hazard analysis for new research should include electrical safety when appropriate. Contact EHS to review any procedure or equipment setup that exposes lab personnel to unguarded hazardous voltages of >50 Volts.

P. 52 Part IV

2.1 Laboratory and Chemical Security

New Wording

Contact the EHS Office to determine the appropriate controls. Contact the Campus Safety Working Group (CSWG) to request security cameras to be installed in your DLC.

Old Wording

Contact the EHS Office to determine the appropriate controls.

P. 56 Part IV

3.4 First Aid Kits and Specific Hazard First Aid

New Wording and Section Title

If your Department, Lab or Center (DLC) chooses to have first aid kits in labs, machine shops or other work spaces to treat minor incidental injuries, then there are some additional requirements to address outlined in the First Aid Kit guidance at https://ehs.mit.edu/wp-content/uploads/EHS-0213.pdf. The guidance contains information on kit types, maintenance and training. Because medical attention can be reached within a reasonable time on the MIT Campus it is acceptable in most instances to rely on this if first aid is needed and make that part of an emergency plan. In the event of medical emergencies and *if you are not sure of severity of the injury or appropriate care* call (617) 253-1212 or dial 100 from any MIT phone. Injured personnel not requiring emergency assistance can call MIT's Medical Department Urgent Care in E23 at 617-253-1311 for advice on where to seek care. An injury report must be completed when a first aid kit is used due to an injury/illness https://ehs.mit.edu/workplace-safety-program/occupational-injury-or-illness-reporting.

Work environments with specific potential health hazards such as Hydrofluoric Acid should be equipped with appropriate emergency equipment and in certain limited cases, with medical supplies that are readily available and lab personnel trained for immediate application. Contact the EHS Office 617-452-3477 for a hazard assessment and possible recommendation for such special supplies. For a medical emergency and treatment for a confirmed or suspected cyanide exposure we rely on emergency responders by dialing 100 or 617-253-1212 immediately to reach MIT Campus Police. When calling, it is critical to state that it is a potential cyanide exposure and to request a Cambridge Fire Dept. Paramedic Company ambulance service equipped with a CYANOKIT for first aid treatment of cyanide poisoning (See Laboratory Use of Cyanide Salts guidance https://ehs.mit.edu/chemical-safety-program/chemicals/).

Old Wording and Section Title

3.4 First Aid Kits

It is the policy of MIT Medical and EHS not to recommend or issue generic first aid kits for general use on the MIT Campus. Such supplies are readily available at E23 Urgent Care, or can be brought to the scene by Campus Police (X100) within minutes if indicated. Individual workers may choose to purchase first aid kits for their own personal use in treating trivial incidental injuries. Kits that meet ANSI and AMA standards are available for purchase in the Pharmacy at MIT Medical. Purchasing, securing, and maintaining such kits are the personal responsibility of the individual. Work environments with specific potential health hazards on the MIT Cambridge Campus should be equipped with appropriate emergency equipment and in certain limited cases, with medical supplies. Contact the EHSO 2-3477 for a hazard assessment and possible recommendation for such special supplies which the affected Departments will purchase accordingly. This may include ANSI and AMA approved simple first aid kits that would be procured and maintained by the Department or their designee. For the Medical Department's Policy on First Aid Kits at MIT, visit: https://ehs.mit.edu/sops/ (certificate login is required).

P. 63 Part IV Appendix 10.3

10.3 Hazard Communication Standard Pictogram

New Wording and Chart (Higher resolution)

Taken from OSHA website at:
http://www.osha.gov/Publications/HazComm_QuickCard_Pictogram.html

HCS Pictograms and Hazards

The Hazard Communication Standard (HCS) require pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification.

Health Hazard  • Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity	**Flame**  • Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides	**Exclamation Mark**  • Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder  • Gases Under Pressure	**Corrosion**  • Skin Corrosion/ Burns • Eye Damage • Corrosive to Metals	**Exploding Bomb**  • Explosives • Self-Reactives • Organic Peroxides
Flame Over Circle  • Oxidizers	**Environment** (Non-Mandatory)  • Aquatic Toxicity	**Skull and Crossbones**  • Acute Toxicity (fatal or toxic)

Old Wording and Chart (Lower resolution)

Taken from OSHA website at: http://www.osha.gov/Publications/HazComm_QuickCard_Pictogram.html

This handout and other GHS information is available on MIT EHS website at: https://ehs.mit.edu/site/chemical-safety/common-chemicals-non-labs-mit-shops-and-studios

Hazard Communication Standard Pictogram

As of **June 1, 2015**, the Hazard Communication Standard (HCS) will require pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification

HCS Pictograms and Hazards

Health Hazard

- **Carcinogen**
- **Mutagenicity**
- **Reproductive Toxicity**
- **Respiratory Sensitizer**
- **Target Organ Toxicity**
- **Aspiration Toxicity**

Flame

- **Flammables**
- **Pyrophorics**
- **Self-Heating**
- **Emits Flammable Gas**
- **Self-Reactives**
- **Organic Peroxides**

Exclamation Mark

- **Irritant (skin and eye)**
- **Skin Sensitizer**
- **Acute Toxicity**
- **Narcotic Effects**
- **Respiratory Tract Irritant**
- **Hazardous to Ozone Layer (Non-Mandatory)**

Gas Cylinder

- **Gases Under Pressure**

Corrosion

- **Skin Corrosion/Burns**
- **Eye Damage**
- **Corrosive to Metals**

Exploding Bomb

- **Explosives**
- **Self-Reactives**
- **Organic Peroxides**

Flame Over Circle

- **Oxidizers**

Environment

(Non-Mandatory)

- **Aquatic Toxicity**

Skull and Crossbones

- **Acute Toxicity (fatal or toxic)**