

This reference guide applies when there is a proposed increase in the quantity of hazardous materials used or stored in a laboratory/area. The increase in the quantity of hazardous materials will require a Maximum Allowable Quantities (MAQ) review by the Campus Fire Marshal (CFM). Once notified, the CFM is required to complete a review of the laboratory space/area chemical inventory as it applies to Campus MAQ requirements. This guide will apply to all campus and/or UCI leased properties and it is the responsibility of the Principal Investigator (PI), Project Manager (PM) and/or department manager to ensure that applicable Title 24 California Fire Code (CFC), California Building Code (CBC) and Cal OSHA requirements are followed related to the use and storage of hazardous materials.

Definitions

Chemical Hygiene Plan (CHP): A written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment, and work practices that are capable of protecting employees from the health and physical hazards presented by hazardous materials used in that particular workplace and meets the requirements of [Cal OSHA subsection 5191\(e\)](#). The CHP outlines the chemical inventory requirements and online chemical inventory systems for the campus.

Chemical Inventory: Chemical inventories shall be reconciled at least annually and updated every time a chemical container is brought into the space or removed from the inventory. All locations are required to have a documented list of hazardous chemicals and quantities of chemicals stored, and follow applicable storage and handling Standard Operating Procedures and storage/handling compliance requirements. All areas which use or store hazardous materials are required to have a current chemical inventory.

Closed System: The use of a solid or liquid hazardous material involving a closed vessel or system that remains closed during normal operations where vapors emitted by the product are not liberated outside of the vessel or system and the product is not exposed to the atmosphere during normal operations; and all uses of compressed gases. Examples of a closed system include product conveyed through a piping system into a closed vessel, system, or piece of equipment.

Control Area: Spaces within a building where quantities of hazardous materials not exceeding the maximum allowable quantities per control area are stored, dispensed, used, or handled.

Flammable Gas: A material which is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa)], subdivided as follows:

- Category 1A:
 - is ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume in air; or
 - has a flammable range at 14.7 psia (101 kPa) with air of at least 12 percentage

points, regardless of the lower flammability limit, unless data show they meet the criteria for Category 1B.

- Category 1B: Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric or chemically unstable, and which have at least either:
 - A lower flammability limit of more than 6 percent by volume in air; or
 - A fundamental burning velocity of less than 3.9 in/s (10 cm/s).

Flammable Liquid: A liquid having a closed cup flash point below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:

- Class IA. Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C).
- Class IB. Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C).
- Class IC. Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C).

Flammable Material: A material capable of being readily ignited from common sources of heat or at a temperature of 600°F or less.

Hazardous Material: Those chemicals or substances which are physical hazards or health hazards as defined by CFC, whether the material is in usable or waste conditions. Hazardous materials are categorized as either a Physical Hazard or a Health hazard (e.g., some examples of Physical Hazard – Flammable, Oxidizer, or Water-reactive. Health Hazard – Highly Toxic or Corrosive).

Maximum Allowable Quantity (MAQ): The maximum amount of hazardous materials allowed to be stored or used within a control area inside a building or an outdoor control area. The maximum allowable quantity per control area is based on the material state (solid, liquid or gas) and the material storage or use conditions. The MAQ within a building must be separated by control areas. These control areas are 1-hour fire barriers for floors basement through 3rd and 2-hour fire barriers 4th floor and higher. The maximum of each hazardous material is defined in California Fire Code (CFC) Tables 5003.1.1 (1), 5003.1.1 (2), 5003.1.1 (3), and 5003.1.1 (4). Most UCI rooms with hazardous materials are classified as B (Business) laboratories and require the MAQs not to be exceeded per the above tables.

Open System: The use of a solid or liquid hazardous material involving a vessel or system that is continuously open to the atmosphere during normal operations and where vapors are liberated, or the product is exposed to the atmosphere during normal operations. Examples of open systems for solids and liquids include dispensing from or into open beakers or containers, dip tank, and planting tank operations.

Outdoor Control Area: An outdoor area that contains hazardous material in amounts not exceeding the maximum allowable quantities of Table 5003.1.1 (3) or table 5003.1.1 (4).

Pyrophoric Gas: Gases that ignite spontaneously in air at a temperature of 54°C (130°F) or below.

Storage of Hazardous Material: The keeping, retention or leaving of hazardous materials in closed containers, tanks, cylinders, or similar vessels; or vessels supplying operations through closed connections to the vessel.

Used (Material): Placing a material into action, including solids, liquids, and gases.

General Requirements

For projects where a PM (Facilities Management, Design & Construction Services or Unit representative) is assigned to the project, the PM will be responsible for ensuring all applicable documentation is provided to the CFM. If a PM is not assigned, the PI or unit manager is responsible for providing applicable material to EHS.

A MAQ review is required for all projects when hazardous materials are used or stored (in or outside of a building) which have MAQ limits per the CFC. The MAQ review is based on control areas, which may be a larger area than the specific lab/space where the work is being conducted. If the review determines the quantities (existing or proposed) exceed the allowable MAQ limits, a more comprehensive evaluation will need to be conducted before the Campus Fire Marshal can provide project approval.

The following are scenarios when a project requires an evaluation related to MAQ compliance, if unsure, please contact your EHS School Coordinator or the Campus Fire Marshal for clarification:

- If hazardous materials are to be present in a renovated lab, Campus Fire Marshal and/or Chemical Hygiene Officer (CHO) shall review the chemical inventory being used in the lab. The incoming PI will need to fill out the Hazardous Material Inventory Statement (HMIS) CFC 5001.5.2 ([Appendix A](#)). This inventory is needed to evaluate against the current chemical inventory within the current control area to see if a MAQ issue may exist.
- If a lab is requesting to add or remove a fume hood, the chemical inventory should be analyzed by the CHO or Fire Marshal for a possible MAQ overage.
- If a lab is requesting to add or remove a flammable cabinet or a gas cabinet, the chemical inventory should be analyzed by the CHO or Fire Marshal for a possible MAQ overage.
- If a lab is going through a large process change and new hazardous/flammable chemicals are being introduced into the lab.
- If the building housing hazardous material is getting a building fire sprinkler upgrade. Campus Fire Marshal shall view all control areas in the building for MAQ compliance.
- If the building is being modified and established control areas are being affected/changed.
- A lab introduces new hazardous materials to their inventory or increases the amount of hazardous materials within the lab/control area.
- A new PI is assigned space and their lab/area will have hazardous materials.

Chemical Inventory Requirements

The CHP requires that each laboratory group and/or location that stores hazardous materials are required to maintain a current chemical inventory that lists all of the chemicals and compressed gases stored in the labs and the quantity of these chemicals. Chemical inventories are used to ensure compliance with storage limits/fire regulations and are used in the case of an emergency.

PI/Laboratory Supervisor Responsibilities:

- Maintain a current chemical inventory that includes the location and quantity of all chemicals and compressed gases.
- Chemical inventory must be reconciled at least annually to ensure that the electronic inventory and physical inventory are the same.
- [Contact hazardous waste management](#) to dispose of any materials that are no longer useful, have decomposed, need to be replaced, have a damaged bottle, etc.

Responsibilities of Personnel Who Handle Potentially Hazardous Chemicals:

- Inventory should be reviewed prior to ordering a new chemical.
- Only the minimum amount of chemicals necessary for the research should be purchased.
- New chemical containers must be added to the online inventory the same day that they are added to the laboratory.
- Unneeded, expired, and/or degraded chemical containers should be discarded as chemical waste.
- Discarded containers must be removed from the online inventory the same day that they are removed from the laboratory.

Prior to Design or Pre-Plan Requirements

- Requestor must provide a current chemical inventory for the lab space/area. For projects involving hazardous materials, the requestor must provide a list of chemicals to be used or stored in the lab/area by completing and submitting the HMIS form ([Appendix A](#)).
- In addition, requestor must complete and submit the MAQ Review Checklist ([Appendix B](#)).
- Once the CFM has received the HMIS form ([Appendix A](#)) and MAQ Review Checklist ([Appendix B](#)), EHS will respond within 10 business days. If the project is urgent in nature, the PM, PI, or Unit Manager will need to contact the CFM to determine the appropriate review timeline.

Approved Storage

Approved storage solutions may be implemented to accommodate lab and research needs based on the outcome of the MAQ review process. No more than 10 gallons of flammable solvents may be stored outside of flammable storage cabinets per a defined area, according to Cal OSHA, and most labs have limited cabinet space. For flammables, the typical 65" highly flammable storage cabinet is rated for 45 gallons but cannot hold 5-gallon drums. The large size flammable storage cabinet can hold 5-gallon drums but is only rated for 60 gallons. Corrosives cabinets should be used for corrosive materials. Never use flammable cabinets or undearth sink cabinets to store corrosives, as they will corrode the cabinets, their hardware, and water and gas piping.



MAQ limits can increase for certain hazard classes if stored in approved storage; however, MAQ limits will still apply and must be followed. Approved storage solutions do not allow for unlimited storage of any hazard class.

If you have any questions related to the requirements outlined in this reference guide, please contact EHS at (949) 824-6200 or email safety@uci.edu.