

Safe storage of liquids commonly used in TAU labs

Group A- Flammable Materials (UN group 3)

The Following Chemicals should be stored in a "Flammable Materials Cabinet"
Only:

1-butanol
Acetone
Acetonitrile
Chloroform
Diethyl ether - Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are
Diethylformamide
Dimethylformamide
DMSO
Eosin
Ethanol
Ethyl acetate
Ethylene glycol
Formaldehyde
Formaldehyde
Formalin
Hexane
Isopropanol
K clear plus
Methanol
opened must be carefully resealed and kept upright to prevent leakage.
Phenol
Toluene
Xylene-

Group Ba- Corrosive- Alkaline Materials (UN group 8)

Corrosive- Alkaline Materials

Ammonium Hydroxide
Diethanolamine

Group Bb- Corrosive- Acidic Materials (UN group 8)

Corrosive- Acidic Materials

Acetic acid
Hydrochloric acid
Lactic acid
Perchloric acid
Sulfochromic acid
Sulfuric acid
Trichloroacetic acid
Trifluoroacetic acid

Group Bc- Corrosive (UN group 8)

Corrosive

Sodium Hypochlorite

"Incompatible with acids, metals, metal salts, peroxides, reducing agents, and ethylene diamine tetra acetic acid. Incompatible with ammonia and ammonium compounds such as amines and ammonium salts."

Group C- Toxic Materials (UN group 6)

TOXIC MATERIALS

Dichloromethane
Glutaraldehyde
Hematoxylin
Monoethylene glycol
Mounting medium
osmium tetroxide 4%

Group D- Oxidizing Materials (UN group 5)

oxidizing agents

Hydrogen peroxide

יחידת בטיחות טל' 03-6407555 פקס: 03-6408555

Group E- Store in explosion-proof refrigerator-

Store in explosion-proof refrigerator- Flammables area

Formic acid

Incompatible Materials Strong oxidizing agents, Metals, Powdered metals, Strong bases

Group F- Should be Kept refrigerated.

Should be Keep refrigerated.

Paraformaldehyde- **Incompatible Material** - Water

Group G- Should Kept under nitrogen.

Store under nitrogen Store in a cool, dry place. Store in a tightly closed container.

Ethanolamine

Incompatibilities with Other Materials: Oxidizing agents, acids, acid chlorides, aluminum, anhydrides, copper, galvanized iron

Group H- Should be Kept protected from light.

Special Group- Protect from light

Phenol

Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from light.

Prepared by Dr. Menachem Genut/ Chemical safety Manager, TAU, by screening the SDS's of the chemicals.

Appendix- More to read about the subject

From the following link: <https://www.labmanager.com/lab-health-and-safety/2017/07/handling-and-storing-chemicals#.XXjewnmP7X5>

Handling and Storing Chemicals

Tips for safely moving, storing, and protecting yourself from laboratory chemicals

By [Vince McLeod](#) | July 11, 2017

Let's face it: most laboratories use chemicals. Depending on the lab's focus—research synthesis, compound production, basic acid digestions, etc.—the types and amounts of chemicals used can vary greatly. Unfortunately, reports of accidents and incidents involving the use and storage of chemicals are far too frequent. We must remain diligent in properly handling and storing these hazardous materials, or problems will arise. So, in this column we provide general safety rules of thumb for handling and storing chemicals in the laboratory.

Before we get into the details, it is important to take stock of the many federal, state, and local regulations that may include specific requirements for handling and storing chemicals in labs and stockrooms. For example, controlled substances and consumable alcohols are regulated by the Food and Drug Administration and the Drug Enforcement Agency, radioactive substances are regulated by the Nuclear Regulatory Commission, and hazardous wastes are governed by the Environmental Protection Agency. These specific requirements can range from simple locked storage cabinets and specific waste containers to controlled access for regulated areas. If any of your labs are using or generating potentially hazardous substances, determine which regulations apply and the specific requirements they impose. State or local building and fire codes are very common, and applicability is becoming more demanding each year.

Another hurdle frequently encountered is the fact that labs evolve and change over time. We need to focus awareness on our lab facilities and implement a regular (annual) review process to ensure our overall laboratory safety stays up to date.

First—The right personal protective equipment (PPE)

The focus of this article is safe storage of chemicals. But before we start rounding up bottles of chemicals and reorganizing our labs, we need to make sure we have the proper PPE. At a minimum, this should include appropriate chemical-resistant gloves and eye protection, closed-toe shoes (essential for working in the laboratory), and lab coats and/or chemical aprons (used when needed or when required by your laboratory safety policy).

Once we have collected our PPE, there are just a couple more things to gather before we begin moving those chemical containers around. Survey your surroundings, and take notice of any potential trip hazards and locations of work stations where others are busy. Make sure exits, passageways, and emergency equipment areas (i.e., eyewash and safety showers) are clear and free of stored materials. Locate and have

יחידת בטיחות טל' 03-6407555 פקס: 03-6408555

close at hand a full spill kit with appropriate absorbent materials, neutralizing agents, cleanup utensils, and waste containers. Finally, check that all chemical containers have complete labels in good condition and that safety data sheets (SDS) are readily available. Consult OSHA's Hazard Communication Standard¹ for guidance. Another good resource for this is the *Standard System for the Identification of the Hazards of Materials for Emergency Response*.²

Next—Safe transport

Here are our pointers for moving chemicals safely:

- Never move visibly degrading chemicals and containers. Report these to your lab supervisor or principle investigator.
- Whenever transporting chemicals, place bottles in appropriate, leak-proof secondary containers to protect against breakage and spillage. A good example is using a special plastic tote for carrying four-liter glass bottles of corrosives or solvents.
- When moving multiple, large, or heavy containers, use sturdy carts. Ensure cart wheels are large enough to roll over uneven surfaces without tipping or stopping suddenly. If carts are used for secondary containment make sure the trays are liquid-tight and have sufficient lips on all four sides.
- Do not transport chemicals during busy times such as break times or (for those academic laboratories) lunch periods or class changes.
- Use freight elevators for moving hazardous chemicals whenever possible to avoid potential incidents on crowded passenger elevators. Remember to remove gloves when pushing elevator buttons or opening doors.
- Never leave chemicals unattended.

Rules for chemical storage

Safely storing chemicals in a laboratory or stockroom requires diligence and careful consideration. Correct use of containers and common lab equipment is critical. To store chemicals safely, DO the following;

- Label all chemical containers fully. We recommend including the owner's or user's name along with the date received.
- Provide a specific storage space for each chemical, and ensure return after each use.
- Store volatile toxics and odoriferous chemicals in ventilated cabinets. Please check with your environmental health and safety personnel for specific guidance.

יחידת בטיחות טל' 03-6407555 פקס: 03-6408555

- Store flammable liquids in approved flammable liquid storage cabinets. Small amounts of flammable liquids may be stored in the open room. Check with your local authority (e.g., fire marshal, EH&S personnel) for allowable limits.
- Separate all chemicals, especially liquids, according to compatible groups. Follow all precautions regarding storage of incompatible materials. Post a chemical compatibility chart for reference, both in the lab and next to chemical storage rooms.
- Use appropriate resistant secondary containers for corrosive materials. This protects the cabinets and will catch any leaks or spills due to breakage.
- Seal containers tightly to prevent the escape of vapors.
- Use designated refrigerators for storing chemicals. Label these refrigerators CHEMICAL STORAGE ONLY—NO FOOD. Never store flammable liquids in a refrigerator unless it is specifically designed and approved for such storage. Use only explosion-proof (spark-free) refrigerators for storing flammables.

And AVOID doing the following:

- Storing large, heavy containers or liquids on high shelves or in high cabinets. Instead store these at shoulder level or below.
- Storing bottles on the floor unless they are in some type of secondary containment. • Storing chemicals near heat sources or in direct sunlight.
- Storing chemicals in fume hoods. Excessive containers interfere with air flow and hood performance. Only chemicals in actual use should be in the hood.
- Storing anything on top of cabinets. Ensure at least 18 inches of clearance around all sprinkler heads to avoid interference with the fire suppression system.
- Using bench tops for storage. These work spaces should contain only chemicals currently in use.
- Storing chemicals indefinitely. Humidity causes powders to cake or harden. Liquid chemicals evaporate. We strongly recommend all containers be dated when they arrive in the lab. Ensure all manufacturers' expiration dates are strictly followed. Pay special attention to reactive or dangerous compounds. Dispose of all outdated, hardened, evaporated, or degraded materials promptly.

Following these simple guidelines will get you well on the way to an efficient, organized, and safely operating laboratory. Ignore them, or become cavalier in their application, and you may be picking through ashes or rubble one day. Spend a few minutes going through the lab with this list on a regular basis, and you should avoid any major incidents with chemical storage. As always, safety first.

יחידת בטיחות טל' 03-6407555 פקס: 03-6408555

References: -

1. *OSHA Hazard Communication Standard* -
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099
2. *Standard System for the Identification of the Hazards of Materials for Emergency Response*, National Fire Protection Association, Publication 704.
<http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=704>
3. *NIOSH Pocket Guide to Chemical Hazards*. National Institute of Occupational Safety and Health. Publication 2005-149. <http://www.cdc.gov/niosh/npg/>
4. *The Merck Index: An Encyclopedia of Chemicals, Drugs and Biologicals*. 14th edition. Merck & Company, Inc. Rahway, N.J. Latest edition.
5. *Prudent Practices in the Laboratory: Handling and Disposal of Chemicals*. National Research Council. National Academy Press. Washington, D.C. Latest edition.