CHEMICAL SAFETY
In 1983 California enacted legislation to ensure that employees are properly informed and trained about the chemical hazards they may encounter in the workplace.

All businesses, large and small, in all industries were required to be in compliance with this law by May of 1988.
HAZARD COMMUNICATION STANDARD

- Over 30 million workers in the United States are potentially exposed to chemical hazards on a regular basis each year. The objective of the regulation is to help reduce chemical related illnesses and injuries in the workplace by informing employers and employees about chemical hazards and how to protect against them.

- A fundamental premise of the Hazard Communication Standard (HCS) is that employees who may be exposed to hazardous chemicals in the workplace have a right to know about the hazards and how to protect themselves. For this reason, the HCS is sometimes referred to as the Right-to-Know law.
Hugh B. Kareful and Your Uncle Sam
Want You To Know
You Have A Right To Know

About Hazardous Materials in Your Workplace!
The "Right-To-Know" law requires employers to inform and train employees about the chemicals they use or to which they may be exposed. The scope of the law concerns all chemicals in the workplace that could be considered a hazard. The law is composed of four distinct provisions.

- First, each employer must develop a Written Hazard Communication Program.
- The second important area involves making a List of All Hazardous Chemicals used in your facility and then obtaining a MSDS.
- The third area addresses Container Labels.
- The fourth provision requires all employers to provide Training and Information to employees and contractors that will help them identify and protect themselves from the effect of hazardous material exposure.
How Does Hazard Communication Apply to Me?

- You may be working with or around chemicals.
- You may be procuring chemicals.
- You may be supervising employees using chemicals.
MATERIAL SAFETY DATA SHEETS (MSDS)
Material Safety Data Sheets
Manufacturer Requirements

- Chemical manufacturers are required by law to evaluate each chemical they produce to determine if it is hazardous.
- The manufacturer must supply the buyer with an MSDS that describes all the findings of the evaluation.
- The MSDS explains the properties of the chemical and what you should know to protect your safety.
- MSDS can look different, but must have minimum health and safety information.
An MSDS is required for every chemical used or stored and shall be maintained in the yellow and red binder.

All employees shall read the MSDS before beginning to work with that material.

All laboratories must have a complete chemical inventory for all chemicals used and/or stored.

MSDS must be immediately available.

MSDS must be reviewed prior to procuring a chemical.
OSHA specifies the information to be included on an MSDS, but does not prescribe the precise format for an MSDS.

Information Provided on an MSDS:
- Company Information
- Hazardous Ingredients
- Physical Data
- Fire and Explosion Hazard Data
- Health Hazard Data
- Reactivity (Instability) Data
- Spill or Leak Procedures
- Special Protection Information
- Special Precautions
Since the OSHA Standard does not impose a format on MSDSs, there is a wide variation in the order in which the information is presented, and in the number of pages.

- The length of an MSDS can range from two to eight pages or more.

In an effort to improve the completeness, accuracy, and consistency of MSDSs, the Chemical Manufacturers Association (CMA) has developed a voluntary standard for their preparation. The standard was published in 1993 as ANSI Z400.1-1993, "American National Standard for Hazardous Industrial Chemicals -- Material Safety Data Sheets -- Preparation."

The Standard is 179 pages long. It establishes an MSDS format containing sixteen sections.
MATERIAL SAFETY DATA SHEETS

IMPORTANT NOTE

- The quality and accuracy of MSDSs varies widely.

- A Material Safety Data Sheet is for the benefit of people who work with hazardous chemicals. If it is not in a reasonably accurate, useful, and understandable format, it will not achieve its purpose.

- One recent study showed that of 150 randomly selected MSDSs, information was inaccurate in Health Effects (63%), in First Aid Procedures in 24%, in Personal Protective Clothing in 53%, and in Occupational Exposure Limits in 53%.

The purpose of the Chemical Hygiene Program is to provide the chemical user with basic safety information regarding the use of chemicals in laboratories. It also includes information on the safe storage, use, and disposal of chemicals in laboratories.
CHEMICAL HYGIENE PLANS (CHP)

- A Chemical Hygiene Plan is required where:
  - There is multiple chemical procedures or chemicals used.
  - There is significant chemical use as defined by regulatory standards and

- A CHP *may* be required if there is an Pre-OSR listing chemical usage
  - Note, CHP would not be required for non chemical laboratory operations where chemical use is incidental, such as within a electronics lab where there Q tip application of solvents to clean circuit boards is used.
When most people think of chemical safety, images of spills, fires, explosions and environmental damage appear. However, many chemical incidents are less dramatic and not as obvious, such as:

- the health damage caused by long-term exposure or sudden reactions due to short-term exposure with caustic chemicals.

Therefore, it is important to recognize and effectively communicate the presence of the most common forms of chemical hazards in the workplace.
POTENTIAL HAZARDOUS SUBSTANCES

- Acids/bases
- Flammable liquids
- Oils/Lubricants
- Reactive chemicals
- Oxidizers
- Compressed gases
- Cryogenic liquids
- Metals and metal salts
- Poisons,
- Carcinogens
- Irritants
ACIDS AND BASES

- **Acid**
  - Corrosive substance that reacts with caustics to form salts; pH: 1 to 7.
  
  - Examples of acids used within MDL: Mineral acids (hydrofluoric acid, nitric acid, sulfuric acid); Organic acids (acetic acid).

- **Bases**
  - Corrosive substance that neutralizes acids. Also referred to as caustics; pH: 7 to 14.
  
  - Examples of bases used at MDL: Ammonium hydroxide, KOH, AZ Developer.
FLAMMABLE LIQUIDS

- Is a substance with a flash point below 100°F.

- Flash point
  - Is the minimum temperature at which a liquid gives off vapor in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.

- Examples of flammable liquids used at MDL:
  - Alcohols (methanol, IPA), acetone, toluene, xylene.
SOLVENTS

- Are substances that dissolve another substance at the molecular level.
- Included are aromatics, esters, ethers, ketones, amines, and halogenated hydrocarbons.
OILS/LUBRICANTS

- Examples of common oils/lubricants used at MDL
  - WD40, pump oils (diffusion pump oil, Krytox 1525).
**REACTIVE CHEMICALS**

- Reactive chemicals are classified as:
  - Oxygen sensitive
  - Water sensitive
  - Shock sensitive
  - Air reactive
  - Light or Heat reactive
  - Acid reactive (i.e., sulfides, cyanides, etc.)

- Refer to your MSDS to determine if the chemical you are working with is reactive.
OXIDIZERS

- Many strong oxidizing agents are capable of detonation or explosive decomposition under conditions of strong heat, confinement, or a strong shock.
- Violent reactions can occur when strong oxidizers are mixed with combustibles such as wood or paper.
- Strong oxidizing agents that can cause explosions include perchlorates, inorganic nitrates, chlorates, chromates and the halogens.
- Strong oxidizing agents will also react violently with most organic compounds, powdered metals, sulphur, phosphorus, boron, silicon, and carbon.
- Examples of common oxidizers used at MDL
  - Chlorates, hydrogen peroxide, nitric acid, nitrates, oxygen, perchlorates, sulfuric acid, etc.
Air Reactive

- Air reactive chemicals (also called pyrophoric materials) ignite spontaneously in air at temperatures below 130 degrees F.
  - Finely divided metal powders that do not have a protective oxide coat may ignite when a specific surface area is exceeded.
  - The degree of reaction depends on the size of the particle, its distribution, and surface area.
- Common examples include white phosphorus, fine zirconium powder, and activated zinc.
**Water Reactive**

- Water reactive chemicals are chemicals that combine with water or moisture in the air to produce heat, flammable, explosive or toxic gases.

- Water reactive chemicals can present a severe fire hazard because sufficient heat is often released to self ignite the chemical or ignite nearby combustibles. In addition, contact with the skin can cause severe thermal and alkali burns.

- Common examples at MDL include strong acids and bases, alkali metals such as sodium and potassium, hydrides, and carbides.
Many pure substances can undergo vigorous polymerization quite easily by themselves when they are heated slightly or exposed to light. These include:

- acrylic acid
- acrylonitrile
- cyclopentadiene
- diketene
- ethyl acrylate
- hydrocyanic acid
- methacrylic acid
- methyl acrylate
- styrene
- vinyl acetate
SHOCK SENSITIVE

- Some chemicals can be shock sensitive (or form crystals that can become shock sensitive).

- In some cases chemicals can react vigorously and, in some cases, explosively under conditions of small mechanical shock such as a hammer blow or even slightly elevated temperature or pressure.
Cryogenic Liquids

- A cryogen is defined as a liquefied gas with a normal boiling point below -150 °C (-238 °F).

- Cryogens have distinguishing characteristics.
  - They are extremely cold;
  - They have extremely low critical temperatures (i.e., the highest temperature at which a material can remain as a liquid, regardless of pressure);
  - They have an extremely high expansion ratio when their phase changes from liquid to gas.
COMPRESSED GASES

- A gas or mixture of gases under pressure in a container.

- Examples
  - **Inert:** nitrogen, helium, argon;
  - **Flammable:** hydrogen, acetylene, phosphine;
  - **Reactive:** fluorine, nitrous oxide, oxygen.

- Remember the chemical itself is only part of the hazard - the pressurized container can also create a hazard.
Carcinogens, Teratogens & Mutagens

- Examples include: benzidines, nitrobenzens, naphthylamines, nitrosylamines, benzanthracenes, methylcholanthrene, diphenylamines, diethylstibesterol, ethyleneimine, asbestos fibers, ethane sulfonate, etc.
CONTACT IRRITANTS

- Contact irritants include: formalin, iodides, picryl chloride, isocyanates, and dinitochlorobenzene, etc.
CHEMICAL HEALTH HAZARDS

A chemical for which there is statistically significant evidence that acute or chronic health effects may occur in exposed employees. Chemicals are health hazards if they are:

- Carcinogens
- Toxic Agents
- Reproductive Toxins
- Irritants
- Corrosives
- Sensitizers
- Target Organ Agents
Routes of Entry

- **Inhalation** or breathing in of the substance or contaminant. This is the primary route of entry.

- **Absorption** through the skin or eyes.

- **Ingestion** through swallowing or drinking of contaminants.

- **Injection** through needles, broken glass, or sharp objects.
TARGET ORGAN EFFECTS

- Hepatotoxins - Liver
- Nephrotoxins - Kidney
- Neurotoxins - Nervous System
- Hematopoietic system toxins - Blood
- Respiratory system toxins
- Reproductive hazards
- Cutaneous hazards - skin
- Eye hazards
LOCAL VS. SYSTEMIC

- **Local:** A localized effect occurs when a substance reacts at the point of contact (example, acid causing skin irritation at the area of contact).

- **Systemic:** Effects result from substances entering the body and harming one system of the body (example, pesticides entering through the skin and damaging the liver and CNS).
IRRITANTS AND SENSITIZERS

- **Irritants.** These are chemicals that cause rashes or inflammation at the point of contact.
  - Examples include gasoline, mineral spirits, acids, caustic soaps, concentrated cleaners, paints, stains, oils and grease.

- **Sensitizers.** These are chemicals that can cause allergic reactions after repeated exposure. When using chemicals that are sensitizers, some people will experience a more severe reaction each time they are exposed.
  - Examples include adhesive products and turpentine.
ACUTE VS. CHRONIC

- **Acute** implies an exposure to a large dosage in a short period of time.
  - Skin burns from acid.

- **Chronic** is the opposite, it is an exposure to a small dose over a long period of time.
  - CNS damage from small doses of heavy metals over time.
**Corrosives and Toxics**

- **Corrosives.** These have the potential to cause redness, inflammation, irritation and even severe burns depending on the duration of exposure, the corrosive strength of the product and the sensitivity of the individual exposed.
  - Examples include acids, bases, drain cleaners, bleach and certain detergents.

- **Toxics.** These are substances that can cause short-term or long-term health effects or are suspected of causing cancer, disease or injury under certain conditions.
  - Examples include benzene, TCE, etc.
SIGNS OF OVEREXPOSURE

- **Acids & Bases:**
  - Skin contact: Burns, open sores, or scarring;
  - Inhalation: Upper respiratory irritation;
  - Ingestion: Digestive disturbances.

- **Metals**
  - Skin contact: possible redness, irritation;
  - Inhalation: Upper respiratory irritation, possible CNS and/or other organ (e.g., liver, kidney, etc.);
  - Ingestion: Digestive disturbances.
SIGNS OF OVEREXPOSURE (CONT.)

- **Flammable Liquids**
  - Inhalation: Dizziness, nausea, CNS depression;
  - Skin contact: Dryness, irritation, redness.

- **Solvents**
  - Skin Contact: dryness, dermatitis, corrosive;
  - Inhalation: Nose, throat, eye irritation, headaches, nausea, drowsiness.

- **Epoxies/adhesives**
  - Skin contact: redness, irritation; can sensitize skin;
  - Inhalation: eyes, mucous membranes irritation; dizziness, headache.
SIGNS OF OVEREXPOSURE (CONT.)

- Compressed Gases:
  - Dependent upon the material or mixture;
  - Can be asphyxiants (such as methane and nitrogen);
  - Can be toxics (such as Carbon Monoxide or Hydrogen Sulfide).
TRADE NAME PRODUCTS

- Beware of Chemicals Disguised as Trade Name products.
  - Read the Label
  - Look for hazardous ingredients on the MSDS
  - Choose the correct PPE
  - Follow all required safety precautions
  - Never mix a trade name product with another material without understanding the ramifications and having the correct protection
PELs & TLVs

- **Permissible Exposure Limit (PEL)** is an airborne concentration of a particular substance, set by OSHA to which a worker can be exposed without adverse effect.

- **Threshold Limit Value (TLV)** is the concentration of a particular airborne substance set by the American Conference of Governmental Industrial Hygienists (ACGIH) that workers may be exposed without adverse effect.
PELs & TLVs
CONTROL MEASURES

- Engineering controls
- Administrative controls
- Personal Protective Equipment (PPE)
ENGINEERING CONTROLS

- Best Control Method
- Examples include:
  - Ventilation (fume hoods);
  - Local exhaust ventilation;
  - Closed systems (HRS/Fueling Ops);
  - Isolation/Barriers (i.e. shielding, glove boxes in etc.).
ADMINISTRATIVE CONTROLS

- Training and Communication
  - Safety classes, on-site hazard evaluation reviews, Pre Ops briefing, etc.

- Policies and Procedures
  - OSR, OSS, Safety Survey;
  - MDL Rules;
  - Project Safety Plan;
  - Specific Hazardous Procedures.

- Substitution of Process or Chemical

- Work Practices
PERSONAL PROTECTIVE EQUIPMENT

BE A PRO AND WEAR
PERSONAL PROTECTIVE EQUIPMENT ON THE JOB

1. PPE does not make you immortal. Never use it in place of common sense. Follow all safety rules and procedures at all times.

2. If you don’t know, or have forgotten, how to use a particular piece of PPE, ask your supervisor for instructions before use.

3. PPE must always be maintained in a clean, sanitary, and serviceable condition. Follow appropriate decontamination procedures before re-use.

4. Damaged or defective PPE must never be used.

5. Make sure your PPE is strong enough for the job. PPE should meet or exceed applicable recognized performance standards, such as ANSI, NIOSH, etc.

6. Never use PPE that has not been specifically approved by your employer.

7. Never modify your PPE in any way without the express written consent of your employer.

8. Some PPE may have special disposal requirements. Make sure you follow them.

9. If your PPE doesn’t fit or is uncomfortable, tell your supervisor immediately.

10. NEVER, EVER CHOOSE NOT TO WEAR PPE WHEN IT’S REQUIRED.
PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Used as added protection with other controls.

- Used when engineering controls are not feasible or for short-term exposures.
  - Eye protection: glasses, goggles;
  - Face protection: face shield;
  - Skin, body: gloves, aprons, coats;
  - Respiratory: air-purifying, air-supplying/

- Used as added protection with other controls.
PPE COMMANDMENTS

- PPE Does not make you immortal.
- PPE is often the last line of defense before exposure.
- Never use PPE in place of common sense
- PPE must always be maintained to be effective.
- Make sure the PPE chosen is correct for the task.
- If your PPE does not fit, is damaged, or is not effective, report this to your supervisor immediately.
LABORATORY SAFETY TIPS

- Think Safety First
- Know emergency response
- Know what you are working with
- Use the smallest amounts of chemicals
- Follow all safety procedures (Pre-OSR, SOPs, CHPs)
- Report dangerous acts or conditions
- Store and handle hazardous materials safely
- If you do not know ask...
HANDLING CHEMICALS SAFELY

- Chemicals must be labeled as to identify hazards, manufacturer, and first aid procedures.
- All mixtures shall be thoroughly evaluated prior to use.
- Even common substances can present unique hazards under certain circumstances. For example:
  - Ammonia when mixed with a relatively safe substance such as iodine, it forms nitrogen triiodide, which is explosive.
  - Carbon disulfide is very toxic & very flammable; mixed with air, its vapors can be ignited by a steam bath, a hot plate, or a light bulb.
  - Chlorine may react violently with hydrogen or with hydrocarbons when exposed to sunlight.
  - Diazomethane and related compounds are very toxic (potent carcinogens), and the pure gases and liquids explode readily.
  - Ethylene oxide has been known to explode when heated in a closed vessel.
HANDLING CHEMICALS SAFELY

- Chemical substances of unknown hazards shall be assumed to be hazardous, and any chemical mixture shall be assumed to be as hazardous as its most hazardous component.

- A fume hood shall be used when appreciable quantities of chemicals with high vapor pressures are transferred from one container to another, allowed to stand, or heated in open containers.

- Chemical containers shall be kept closed at all times.

- Mouth suction for pipetting or starting a siphon is prohibited.
HANDLING CHEMICALS SAFELY

- Even apparently safe storage can be a potential problem. For example, the following chemicals are often found incorrectly stored together:
  - Acetic Acid and Nitric Acid
  - Perchloric Acid and Sulfuric Acid
  - Concentrated Acids and Bases
- Also be cognizant of chemical compatibilities before mixing chemicals, reusing glassware, or disposing of contaminated items.
- Always consult the MSDS regarding chemical incompatibilities.
SAFELY TRANSPORTING CHEMICALS

- Transporting your chemicals is one of the riskiest procedures you can perform with them because at no other time is accidental release and exposure more likely.
- However, by using the same care and caution before and during transport that you would for any experimental procedure, you can minimize the danger to yourself, others, and the environment.
- Individuals transporting chemicals shall be familiar with the material’s what hazards and know to do in the event of a release or spill.
  - Material Safety Data Sheets (MSDSs) are a good source for this information.
SAFELY TRANSPORTING CHEMICALS

SAFE WORK PRACTICES

- Hazardous chemicals must be attended at all times while being transported.
- Wear appropriate Personal Protective Equipment (PPE) when transporting chemicals.
- Label primary containers with the material’s chemical name and its hazards (e.g., “Acetone Caution—Flammable”).
  - Secondary containment that obscures a primary container’s labeling must be labeled with the same information.
- Never transport non-compatible chemicals in the same secondary containment or in a way that might allow the chemicals react.
- Transport cryogens only in approved storage vessels (e.g., dewar flasks with pressure relief mechanisms).
- Immediately update chemical inventories to reflect the relocation of chemicals.
**Safely Transporting Chemicals**

- Use sturdy carts for transporting multiple, large, or heavy containers.
  - Carts used for secondary containment must have a liquid-tight tray with lips on four sides.
- Place glass bottles in secondary container (bottle carrier)
- When carrying plastic chemical containers have your hands free from other materials and carry one at a time.
- Transport compressed gas cylinders only with the valve covers screwed on and when securely attached to a compressed gas cart.
SAFELY STORING CHEMICALS

- Each chemical must have a proper designated storage location and be returned there immediately after use.
- Properly segregate chemicals into compatible categories (hazard classes) for storage.
  - Do not use the ASM Method.
  - The Alphabetical Storage Method.
- Storing chemicals by alphabetical order will often result in the placement of incompatible chemicals being next to one another.
  - Only within the segregation groups can chemicals be stored alphabetically.
- Storing chemicals by compatibility means for example:
  - Inorganic cyanides should be stored away from acids
  - Oxidizers should be separated from organics.
- If a chemical exhibits more than one hazard, segregate by using the characteristic that exhibits the primary hazard.
SAFELY STORING CHEMICALS

- Be aware of nomenclature issues. For example:
  - Phenol can also be named carbolic acid, hydroxy benzene, etc.
- Store liquid and solid materials separately where possible, to avoid contamination in case of a spillage.
- Do not overcrowd shelves or stack containers.
- Do not use lab benches as permanent storage for chemicals.
  - The chemicals can easily be knocked over.
- Do not use fume hoods as a permanent storage location for chemicals
  - Exception: odorous chemicals that may require ventilation.
  - Excess storage in a fume hood will block the baffles, thereby diminishing hood performance increasing the likelihood of having chemical vapors being drawn back into the room.
**Safely Storing Chemicals**

- Carcinogens, suspected carcinogens, and other highly toxic materials should be stored in unbreakable secondary containers in a secure area with restricted access.
- Chemical substances that have been synthesized for the first time in the research laboratory shall be stored in a manner consistent with their potential hazard as determined by analogy to known chemicals of similar composition.
- Chemicals stored in the workplace shall not be exposed to sunlight or heat.
- Chemicals/mixtures must be properly stored at the end of each shift.
**SAFELY STORING CHEMICALS**

- Organic peroxides are among the most hazardous substances handled in research laboratories.
  - Organic peroxides shall be stored safely away from heat, friction, impact, light, as well as strong oxidizing and reducing agents.
- Flammable chemicals not in active use shall be stored inside an NFPA approved flammable storage cabinets.
  - Flammable storage cabinets are designed to protect the contents from the fire rather than to confine burning liquids.
  - They can perform their protective function only if used and maintained properly (doors should be self-closing).
- Acids should be kept in acid storage cabinets.
  - Acid cabinets are similar in construction to a flammable storage cabinet, but are coated with an epoxy enamel to resist corrosion.
  - Glass containers shall be placed in polyethylene trays which will serve as secondary containment to collect small spills and provide additional protection from corrosion to the shelves.
  - Store nitric acid in a separate acid cabinet compartment.
SAFELY STORING CHEMICALS

- Store chemicals in the locations recommended (i.e., where the temperature range, vibration, or the amount of light does not exceed the manufacturer's recommendations).
- Make sure that chemicals that are stored together are compatible.
- Flammable chemicals must be stored in a NFPA approved flammable storage cabinet.
  - NFPA 45, Chapter 7-2.3, defines storage container types and capacities, and NFPA 30 defines standards for the storage of flammable and combustible materials.
Flammable cabinet after a fire at a University
Note: Solvents inside did not burn.
Compressed Gas Safety

- Cylinders must be secured at all times.
- Close valve when not in immediate use.
- Safety cap must be in place when not in use.
- Gaseous asphyxiants such as LN$_2$ may require an oxygen monitor.
- Use of CO (a chemical asphyxiant) gas may require a CO monitoring system.
- Contact OSPO to determine monitoring needs.
CONTAINER LABELING

The HAZCOM Standard requires each label to include:

- The identity of the hazardous material.
- Hazard warnings such as DANGER, WARNING, or CAUTION.

Manufacturer contains have additional requirements such as:

- Name, address, and phone number of the manufacturer, distributor, supplier.
- The description of the material hazard, precautions for the use and handling of the substance and the first aid/emergency response procedures.
LABELING REQUIREMENTS

Rules for working safely with hazardous materials

These four rules apply when handling any type of hazardous material. Let’s review them to see exactly what steps you need to take to protect your safety.

**RULE 1. PAY ATTENTION TO WARNING SIGNS.** They tell you hazardous materials are present and what you should and shouldn’t do around them. Make sure you pay attention to what these signs tell you.

**RULE 2. READ ALL LABELS CAREFULLY.** You should always read the labels on the containers of materials you handle. If no label is present, do not use the material until you’ve learned the necessary safety precautions. Why? Because each label will tell you many important things. The first two items must be on all in-house labels—although some labels might show more information. For example:

- **What is in the container**
- **Possible hazards**
- **Precautions you must take**
- **Symptoms of overexposure**
- **What to do in case of overexposure**
- **Where to find further information and instructions**
- **Safety equipment to use**

---

**ACETONE**

**DANGER!**

Extremely flammable. Harmful if swallowed or inhaled. Causes irritation.

Keep away from heat, sparks, flame. Avoid contact with eyes, skin, clothing. Avoid breathing vapor. Keep in tightly closed container. Use with adequate ventilation. Wash thoroughly after handling.

**EFFECTS OF OVEREXPOSURE:** Contact with skin has a drying effect, causing drying and irritation. Overexposure to vapors may cause irritation of mucous membranes, dryness of mouth and throat, headache, nausea and dizziness.

**FIRST AID PROCEDURES:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If contacted, immediately flush eyes with plenty of water for at least 15 minutes. Flush skin with water. If swallowed, if conscious, immediately induce vomiting.

Consult MSDS for further hazardous information and instructions.
LABELING REQUIREMENTS

- Never remove labels from hazardous material containers.
- Ensure that all hazardous material containers are labeled or marked with the identity of the hazardous material and appropriate hazard warning.
- Ensure that the labels are legible and easily readable.
- A hazard warning label is not intended to be the sole or most complete source of hazard information. For more information refer to the MSDS.
- “Instability” has replaced “reactivity” however the intent is the same.
**CHEMICAL LABELING**

- ALL containers need to be labeled unless they NEVER leave your presence.
- Prepared labels are available for most of chemicals used at MDL. These labels have all the required information, except your name and the date.
- If you can’t find a label, ask.
CHEMICAL LABELING

- Remember, include your name, an In-Use date and a Save-Thru date. Add save-thru dates when the product has exceeded it’s shelf life date.
CHEMICAL INVENTORYING AND INSPECTIONS

- Assure that all hazardous material containers are appropriately labeled or marked with the identity of the material and appropriate hazard warning.
- Maintain a current chemical inventory in a spreadsheet format. Make periodic corrections and update.
- Check chemical containers for integrity, signs of corrosion or crystallization; if such degradation has occurred, arrange for disposal of the material.
- Date chemicals when received and first opened.
  - This will not only assist in using the oldest chemicals first, which will decrease disposal costs, but can help determine potential safety hazards for chemicals that can become unsafe while in storage, e.g., diethyl ether.