UMF
HAZCOM Training
Introduction

This training is intended to help you better understand chemical safety and the health hazards of chemicals.

As users of hazardous chemicals, UMF employees must fulfill certain obligations under the Occupational Safety and Health Administration (OSHA) regulations. In order to meet these requirements, UMF has established programs to conform with these laws to increase your awareness about the chemicals in your work area.
Who is required to have HAZCOM training?

- All employees who may be exposed to hazardous chemicals at work either as a part of their job or in a foreseeable emergency.

- A foreseeable emergency is any potential occurrence that could result in an uncontrolled release of a hazardous chemical (for instance equipment failure, leak or rupture of containers, or failure of control equipment which could result in an uncontrolled release). It doesn't include employee exposures in the event of an accidental fire.
Why is HAZCOM training required?

Employees have a need and right to know the hazards and identities of chemicals exposed to while working.

With knowledge, steps may be taken to

- reduce exposure
- substitute less hazardous materials
- establish proper work practices.
What is required to be addressed in HAZCOM Training

Items addressed in this training module are:

- The details of the UMF HAZCOM Program
- Understanding Hazard Communication
- Understanding Chemical Hazards
- Material Safety Data Sheets (MSDS)
- Container labels
- Terms
What is required to be addressed in HAZCOM Training (Cont.)

If you want more information the Director of Facilities Management, Ben Pratt, is available to discuss the following items with you when you have completed this training module:

- The location and availability of the chemical inventory and material safety data sheets of the chemicals that you work with.
- The location and the physical and health hazards of the hazardous chemicals in your work area.
- Measures that you can take to protect yourself from these hazards and how you'll detect the presence or release of a hazardous chemical.

With the proper information about the chemicals you use, you can take steps to reduce exposures, substitute less hazardous materials, and establish proper work practices. These efforts will help you prevent work-related illnesses and injuries caused by chemicals.
What is "HAZCOM"?

• Hazard Communication (HAZCOM) is based on a simple concept - that you have a *right* to know the hazards and identities of the chemicals you are exposed to on your job.

• The HAZCOM program covers both physical hazards (such as flammability), and health hazards (such as irritation, lung damage, and cancer). Most chemicals used in the workplace have some hazard potential, and therefore, are covered by the UMF Chemical Safety Policy and HAZCOM Program.
Is this the same as the "Lab Safety / Chemical Hygiene" program?

- Although similar, laboratory use of hazardous chemicals on a laboratory scale is covered under a different OSHA standard (Occupational exposure to hazardous chemicals in laboratories. - 1910.1450).
- *Laboratory* means a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.
- *Laboratory scale* means work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person.
Does the HAZCOM Program apply to all chemicals?

• There are exemptions to the chemicals that fall under the HAZCOM program, such as: consumer products, tobacco, retail beverages and food for consumption, and other items. Some of the exempted items do have additional training requirements, however, they are not part of the HAZCOM program.
How can hazardous chemicals cause harm?

A chemical is hazardous when it has the potential to do physical harm or make one ill. These, then, are the two potential harm categories: *physical hazards* and *health hazards*.
What is a physical hazard?

A chemical which is a compressed gas, explosive, flammable, an oxidizer, unstable of reactive. A chemical is a physical hazard if it:

- is likely to burn or support fire;
- may explode or release high pressures that can inflict body injury; or
- can spontaneously react on its own, or when exposed to water.
What is a health hazard?

A health hazard means a chemical that has been shown to cause acute or chronic health effects in exposed employees. The term "health hazard" includes chemicals and agents which damage the lungs, skin, eyes, or mucous membranes. The health hazard categories are divided into two main categories: Acute and Chronic.
Acute Effects

- **Acute effects** are those which occur immediately, or very soon after exposure. According to OSHA, substances which cause acute effects include the following subcategories of materials:
  - **Irritants** -- like chlorine, acids, resins, solvents, cutting fluids, formaldehyde, which cause reversible inflammation of the eyes, nose, throat, or skin;
  - **Corrosives** -- like caustic or acids, which cause visible destruction of living tissue;
  - **Sensitizing Agents** -- like fiberglass; strong acids and alkalis; epoxy resins, adhesives and sealants; heavy metals; poison ivy/oak, etc. Sensitizing agents can cause persons exposed to develop allergy like responses (such as rash and blisters) upon repeat exposure; and
  - **Toxins** -- like hydrogen sulfide or carbon monoxide, which are poisons. This category is further subdivided into highly toxic and toxic groupings, based on chemical strength.
Chronic Effects

• Chronic effects are those that take a longer time to develop.

These substances can be categorized as:
• *Carcinogens* -- like asbestos and benzene, which are proved or suspected cancer causing substances; and
• *Long-term Toxins* -- like lead and mercury, which are substances which change bodily organs or systems upon repeated exposure.
How much of a hazardous chemical is needed for harm to occur?

- It depends on the toxicity (or potency) of the chemical. The more toxic the substance is, the smaller the amount is needed to produce harm.
- Two key factors, toxicity and the bodily defenses, are used to establish safe limits of exposure. One more factor plays a role, and that is whether the harmful effect is caused by a single exposure to the hazardous material or by cumulative exposure to multiple doses.
How much of a hazardous chemical is needed for harm to occur (cont.)?

If the effect is produced by a single involvement, it makes the most sense to limit exposure so that it never exceeds the amount capable of producing the adverse effect. If the effect is produced by multiple involvements over a long period, it makes the most sense to limit the average daily involvement to some low level amount. Most of the effects resulting from long-term involvements are chronic effects (those that take time to develop).
How do these substances enter the body?

- **Inhalation** - Breathing them in
- **Ingestion** - Swallowing
- **Injection** - through cuts, splinters, punctures, wounds
- **Absorption** - Absorbing it through your skin, or a splash into your eyes or nose
Inhalation

Breathing in chemicals may damage the nose, throat and lungs, or pass into the blood stream and damage other parts of the body. In situations where dangerous concentrations could be present, respiratory personal protective equipment (PPE) must be used.
Injection

• Through cuts, splinters, punctures, or open wounds. Once chemicals have entered your body, they can easily damage tissue or internal organs. Always use PPE when working with sharp objects.
Absorption

- Absorbing it through your skin, or a splash into your eyes or nose. Chemicals can pass through the skin and get into our blood stream. You should avoid direct contact with such materials by using PPE such as gloves, goggles, aprons or other gear to minimize possible contact.
Ingestion

- Swallowing contaminated items or chemicals substances that are very toxic, accidental swallowing of even small quantities can cause harm.
How can we control or minimize the chemical exposure?

Ways to minimize exposure include:

1. **Elimination** – substitute a non-hazardous chemical to eliminate the hazard.
2. **Engineering controls** – improve ventilation; better storage; and design of facilities to minimizing exposure.
3. **Administrative controls** - which are mainly procedures adopted to prevent accidents, and which include buddy systems, use of personal monitors, barriers, entry procedures, employee rotation, time limits, etc.
4. **Personal protection** - Use Personal protective equipment (PPE) for extra precaution and as a last resort. (dust masks, goggles, face shields, aprons, gloves, impervious boots etc.)
More things to remember:

• If you ever use the Facilities industrial cleaners, HAZCOM training is required.

• When trying to minimize or control exposure to hazardous chemicals **Personal Protective Equipment (PPE) is a LAST RESORT.**
Where are Material Safety Data Sheets kept?

• They are kept in your work area.
• The rule requires employers to ensure that the MSDS are *readily accessible* to employees when they are in their work areas during their workshifts. Make sure you know where they are in your work area.
• Your work area(s) will have a chemical inventory. The chemical inventory in each work area is specific to that location. If your inventory is not up to date, please contact UMF Facilities Office for help in doing so.
What information is listed on an MSDS?

**Material Safety Data Sheets**

- OSHA does not expect that every worker will be able to recite all of the information about each chemical in the workplace. The labels serve as an immediate reminder of the hazard information, while MSDS are a more detailed reference source.

- Although the exact form and format of each MSDS may vary, all must contain a certain minimum amount of information. The following is a sample MSDS along with a description of the types of information that you will find, and how each section may apply to you
## NITRIC ACID, 50-70%

**Example items listed on a MSDS**

<table>
<thead>
<tr>
<th>1. Product Identification</th>
<th>Important items you should know</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Synonyms:</strong> Aqua Fortis; Azotic Acid; Nitric Acid 50%; Nitric Acid 65%; nitric acid 69-70%</td>
<td><strong>Chemical Product and Company Identification</strong></td>
</tr>
<tr>
<td><strong>CAS No.:</strong> 7697-37-2</td>
<td><strong>Information about the chemical - such as its chemical formula and CAS number.</strong></td>
</tr>
<tr>
<td><strong>Molecular Weight:</strong> 63.01</td>
<td></td>
</tr>
<tr>
<td><strong>Chemical Formula:</strong> HNO3</td>
<td></td>
</tr>
<tr>
<td><strong>Product Codes:</strong></td>
<td></td>
</tr>
<tr>
<td>J.T. Baker: 411D, 412D, 5371, 5555, 5801, 5826, 5876, 5896, 9597, 9598, 9600, 9601, 9602, 9603, 9604, 9606, 9607, 9608, 9616, 9617</td>
<td></td>
</tr>
<tr>
<td>Mallinckrodt: 1409, 2704, 6623, V077, V336, V561, V633, V650</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Composition/Information on Ingredients</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ingredient</strong> / <strong>CAS</strong> / <strong>Percent</strong> / <strong>Hazardous</strong></td>
<td><strong>Composition/Information on Ingredients</strong></td>
</tr>
<tr>
<td>Nitric Acid / 7697-37-2 50 / 70% / Yes</td>
<td><strong>Identifies the hazardous components of the material.</strong></td>
</tr>
<tr>
<td>Water / 7732-18-5 30 / 50% / No</td>
<td></td>
</tr>
</tbody>
</table>
3. Hazards Identification

Emergency Overview

POISON! DANGER! STRONG OXIDIZER. CONTACT WITH OTHER
MATERIAL MAY CAUSE FIRE. CORROSIVE. LIQUID AND MIST CAUSE
SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED
OR INHALED. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 4  Extreme (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 3 - Severe (Oxidizer)
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT
HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Nitric acid is extremely hazardous; it is corrosive, reactive, an oxidizer, and a
poison.

Inhalation:
Corrosive Inhalation of vapors can cause breathing difficulties and lead to
pneumonia and pulmonary edema, which may be fatal. Other symptoms may
include coughing, choking, and irritation of the nose, throat, and respiratory
tract.

Ingestion:
Corrosive Swallowing nitric acid can cause immediate pain and burns of the
mouth, throat, esophagus and gastrointestinal tract.

Skin Contact:
Corrosive Can cause redness, pain, and severe skin burns. Concentrated
solutions cause deep ulcers and stain skin a yellow or yellow-brown color.

Eye Contact:
Corrosive Vapors are irritating and may cause damage to the eyes. Contact
may cause severe burns and permanent eye damage.

Chronic Exposure:
Long-term exposure to concentrated vapors may cause erosion of teeth and
lung damage. Long-term exposures seldom occur due to the corrosive
properties of the acid.

Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, eye disease, or cardiopulmonary
diseases may be more susceptible to the effects of this substance.
4. First Aid Measures

Immediate first aid treatment reduces the health effects of this substance.

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:
DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.
5. Fire Fighting Measures

Fire:
Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Can react with metals to release flammable hydrogen gas.

Explosion:
Reacts explosively with combustible organic or readily oxidizable materials such as: alcohols, turpentine, charcoal, organic refuse, metal powder, hydrogen sulfide, etc. Reacts with most metals to release hydrogen gas which can form explosive mixtures with air.

Fire Extinguishing Media:
Water spray may be used to keep fire exposed containers cool. Do not get water inside container.

Special Information:
Increases the flammability of combustible, organic and readily oxidizable materials. In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRASORB® or TEAM® 'Low Na+' acid neutralizers are recommended for spills of this product.
8. Exposure Controls / Personal Protection

Airborne Exposure Limits:
- OSHA Permissible Exposure Limit (PEL):
  2 ppm (TWA), 4 ppm (STEL)
- ACGIH Threshold Limit Value (TLV):
  2 ppm (TWA); 4 ppm (STEL)

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, Industrial Ventilation, A Manual of Recommended Practices, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airline hood, or full-facepiece self-contained breathing apparatus. Nitric acid is an oxidizer and should not come in contact with cartridges and canisters that contain oxidizable materials, such as activated charcoal. Canister-type respirators using sorbents are ineffective.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.
9. Physical and Chemical Properties

**Appearance:** Colorless to yellowish liquid.
**Odor:** Suffocating, acrid.
**Solubility:** Infinitely soluble
**Specific Gravity:** 1.41
**pH:** 1.0 (0.1M solution)
**% Volatiles by volume @ 21C (70F):** 100 (as water and acid)
**Boiling Point:** 122C (252F)
**Melting Point:** -42C (-44F)
**Vapor Density (Air=1):** 2-3
**Vapor Pressure (mm Hg):** 18 @ 20C (68F)
**Evaporation Rate (BuAc=1):** No information found.

**Physical and Chemical Properties**

This section will describe the material’s appearance, odor, and health, physical, and environmental hazards that may be of concern for you (and emergency response personnel) to identify a spill or release into your work area.

It’s also helpful to know the vapor density of the chemical. For instance, if the vapor density exceeds 1, the substance will sink in air, and therefore tend to accumulate in low lying areas or basements.

Other information included in this section might be useful to personnel responsible for fire fighting, engineering, or spill clean-up.

10. Stability and Reactivity

**Stability:**
Stable under ordinary conditions of use and storage.
Containers may burst when heated.

**Hazardous Decomposition Products:**
When heated to decomposition, emits toxic nitrogen oxides fumes and hydrogen nitrate. Will react with water or steam to produce heat and toxic and corrosive fumes.

**Hazardous Polymerization:**
Will not occur.

**Incompatibilities:**
A dangerously powerful oxidizing agent, concentrated nitric acid is incompatible with most substances, especially strong bases, metallic powders, carbides, hydrogen sulfide, turpentine, and combustible organics.

**Conditions to Avoid:**
Light and heat.

**Stability and Reactivity**

This section should describe conditions that may result in a potentially hazardous reaction, such as evolution of hazardous gases, production of heat, or other hazardous conditions.
11. Toxicological Information

Nitric acid: Inhalation rat LC50: 244 ppm (NO₂)/30M; Investigated as a mutagen, reproductive effector. Oral (human) \[LDLo\]: 430 mg/kg.

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Cancer Lists:
NTP Carcinogen
Ingredient Known Anticipated IARC Category

Nitric Acid (7697-37-2) No No None
Water (7732-18-5) No No None

12. Ecological Information

Environmental Fate:
No information found.

Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

**Domestic (Land, D.O.T.)**

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Proper Shipping Name: NITRIC ACID (WITH NOT MORE THAN 70% NITRIC ACID)
Hazard Class: 8
UN/NA: UN2031
Packing Group: II
Information reported for product/size: 150LB

**International (Water, I.M.O.)**

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Proper Shipping Name: NITRIC ACID (WITH NOT MORE THAN 70% NITRIC ACID)
15. Regulatory Information

Chemical Inventory Status - Part 1
Ingredient TSCA EC Japan Australia
Nitric Acid (7697-37-2) Yes Yes Yes Yes
Water (7732-18-5) Yes Yes Yes Yes

Chemical Inventory Status - Part 2
--Canada--
Ingredient Korea DSL NDSL Phil.
Nitric Acid (7697-37-2) Yes Yes No Yes
Water (7732-18-5) Yes Yes No Yes

Federal, State & International Regulations - Part 1

SARA 302  SARA 313
Ingredient RQ TPQ List Chemical Catg.
Nitric Acid (7697-37-2) 1000 1000 Yes No
Water (7732-18-5) No No No No

Federal, State & International Regulations - Part 2

RCRA  TSCA
Ingredient CERCLA 261.33 8(d)
Nitric Acid (7697-37-2) 1000 No No
Water (7732-18-5) No No No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: 2PE
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.
16. Other Information

NFPA Ratings: Health: 3 Flammability: 0 Reactivity: 0 Other: Oxidizer

Label Hazard Warning:
POISON! DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.

Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor or mist.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep from contact with clothing and other combustible materials.
Do not store near combustible materials.
Store in a tightly closed container.
Remove and wash contaminated clothing promptly.

Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.

Product Use:
Laboratory Reagent.

Revision Information:
MSDS Section(s) changed since last revision of document include: 3.

Other Information

This section is intended for other material the preparer feels is pertinent, and that should not be included in the other fifteen sections. For example, it may include label information, hazard ratings, revision dates, and references to other related information.
Labels

Why is there specific criteria about container labels?

The purpose of container labeling is to provide an immediate warning to employees of the hazards they may be exposed to; and through the chemical name, labels provide a link to more detailed information available through MSDS and other sources.

– Labeling containers of hazardous chemicals is an essential element of your department's Hazard Communication Program.
– The standards state that ALL containers must be labeled. Labels must be legible and prominently displayed.
– All container contents must be identified
– All containers of hazardous chemicals must include additional information (see below)
– Containers already labeled with the manufacturer's label, do not need additional labels.
What information is required on chemical labels?

- Hazardous chemicals received from suppliers will normally be in containers that are labeled with the key bits of information, including:
  - The identity of the hazardous chemical in the container
  - Appropriate hazard warnings (symbolic or written)
  - The name and address of a party responsible for information about the product (i.e. the name and address of the chemical manufacturer)
  - Target organ effects of the hazardous chemical.
Target organ effects - The following is a target organ categorization of effects which may occur:

- Hepatotoxins: Chemicals which produce liver damage
- Nephrotoxins: Chemicals which produce kidney damage
- Neurotoxins: Chemicals which produce their primary toxic effects on the nervous system
- Blood/Hematopoietic Toxins: Agents which act on the blood or hemato-poietic system: Decrease hemoglobin function; deprive the body tissues of oxygen
- Respiratory Toxins: Agents which damage the lung: Chemicals which irritate or damage pulmonary tissue
- Reproductive toxins: Chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis)
- Cutaneous hazards: Chemicals which affect the dermal layer of the body (irritation, corrosion, allergy, pigment changes, cancer)
- Eye hazards: Chemicals which affect the eye or visual capacity
What if the container doesn't have a label?

• If the container does not have a label, you must label it. If you transfer a hazardous chemical from a labeled container into another container (for example, a spray bottle) and the chemical is not intended for your immediate use, then you must ensure that the new container is labeled properly.

• Examples of labeling methods are the Hazard Material Information System (HMIS) and National Fire Protection Association (NFPA). These are further explained below.

• Again, if the incoming container is already labeled by the chemical manufacturer, importer, or other responsible party, then you do not need to re-label it.
How do the HMIS & the NFPA labels differ?

• Although the HMIS and NFPA labels look similar, there are some differences. The University HAZCOM Program recommends using HMIS labels.

• The HMIS label:
  – Designed to help employees in their day-to-day compliance with the UMPI HAZCOM program.
  – Has a rating system to address information regarding health, flammability, physical hazards, and required personal protective equipment.
  – The HMIS label is a better choice for keeping employees informed about the hazards and how to minimize their exposure.
How do the HMIS & the NFPA labels differ (Cont.)?

• The NFPA label is intended for use by emergency response personnel (i.e. fire fighters, police, hazardous materials workers, etc.) responding to emergency situations. The labels contain information on:
  – Acute health hazards (immediate danger)
  – Flammability (potential to catch on fire)
  – Physical hazard (potential to explode)
  – Special characteristics that might require special fire fighting techniques (such as reactivity with water).
The following definitions are used for the sections of the HMIS and NFPA labels.

**HEALTH (Blue)**

4 - **Deadly**: even the slightest exposure to this substance would be life threatening. Only specialized protective clothing, for these materials, should be worn.

3 - **Extreme Danger**: serious injury would result from exposure to this substance. Do not expose any body surface to these materials. Full protective measures should be taken.

2 - **Dangerous**: exposure to this substance would be hazardous to health. Protective measures are indicated.

1 - **Slight Hazard**: irritation or minor injury would result from exposure to this substance. Protective measures are indicated.

0 - **No Hazard**: exposure to this substance offers no significant risk to health.

**NOTE**: An Asterisk (*) on the HMIS label will signify a Chronic Health Hazard.
4 - Flash Point Below 73°F: This substance is very flammable, volatile or explosive depending on its state. Extreme caution should be used in handling or storing these materials.

3 - Flash Point Below 100°F: Flammable, volatile or explosive under almost all normal temperature conditions. Exercise great caution in storing or handling these materials.

2 - Flash Point Below 200°F: Moderately heated conditions may ignite this substance. Caution procedures should be employed in handling.

1 - Flash Point Above 200°F: This substance must be preheated to ignite. Most combustible solids would be in this category.

0 - Will Not Burn: Substances that will not burn.
REACTIVITY (Yellow)

4 - May Detonate: Substances that are readily capable of detonation or explosion at normal temperatures and pressures. Evacuate area if exposed to heat or fire.

3 - Explosive: Substances that are readily capable of detonation or explosion by a strong initiating source, such as heat, shock or water. Monitor from behind explosion-resistant barriers.

2 - Unstable: Violent chemical changes are possible at normal or elevated temperatures and pressures. Potentially violent or explosive reaction may occur when mixed with water. Monitor from a safe distance.

1 - Normally Stable: Substances that may become unstable at elevated temperatures and pressures or when mixed with water. Approach with caution.

0 - Stable: Substances will remain stable when exposed to heat, pressure or water.

NOTE: On some newer HMIS labels, the yellow - REACTIVITY section has been changed to the color orange and the term is PHYSICAL HAZARD.
<table>
<thead>
<tr>
<th>NFPA Triangle</th>
<th>HMIS Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECIFIC HAZARD (White)</td>
<td>PERSONAL PROTECTION (White)</td>
</tr>
</tbody>
</table>

The WHITE section on the HMIS label uses a Letter (A-K, L-Z) in this section that corresponds to a type of PPE that will be required to be worn while using this chemical.

- **Oxidizer** (OX)
  - A: Safety glasses
  - B: Safety glasses, gloves

- **Acid** (ACID)
  - C: Safety glasses, gloves, chemical apron

- **Alkali** (ALK)
  - D: Face shield, gloves, chemical apron

- **Corrosive** (COR)
  - E: Safety glasses, gloves, dust respirator
  - F: Safety glasses, gloves, chemical apron, dust respirator

- **Use NO WATER**
  - G: Safety glasses, gloves, vapor respirator

- **Radioactive**
  - H: Splash goggles, gloves, chemical apron, vapor respirator
  - I: Safety glasses, gloves, dust and vapor respirator

K: Air line hood or mask, gloves, full chemical suit, boots

L-Z: Special handling instructions. Ask your supervisor.
Things to Remember

- MSDS stands for Material Safety Data Sheets
- MSDS must be readily accessible
- Hazardous chemical labels are required if the chemical has a physical or health hazard.
- Information about the appropriate personal protective equipment (PPE) to wear is on the HMIS label.
More Things to Remember

• On chemical labels, the primary color that indicates a **flammability hazard** is **RED**.

• The combinations on a label that indicates the greatest health hazard is **BLUE – 4 (Deadly)**.
• If you have questions, please call Facilities Management at 778-7006.