

# NJIT

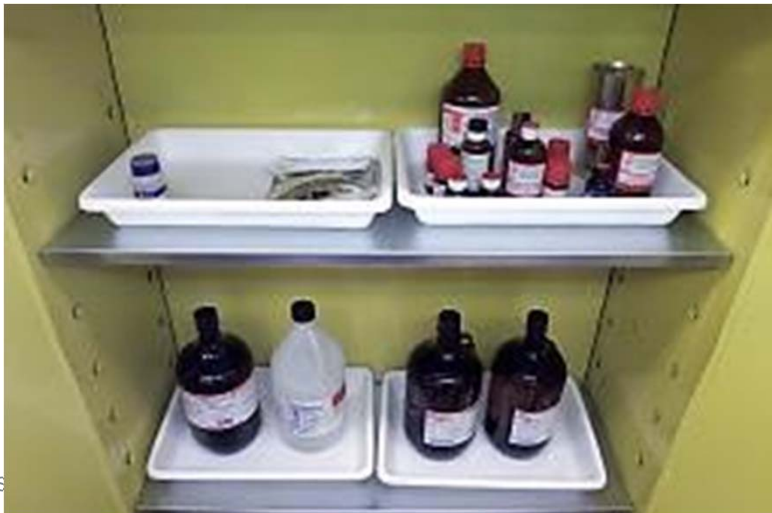
**Hazard Communication Standard 29CFR 1910.1200  
Laboratory Standard 29CFR 1910.1450  
New Jersey Right To Know**

**<http://www.njit.edu/environmentalsafety>**

# Purpose

Hazard Communication Standard 29CFR 1910.1200  
Laboratory Standard 29CFR 1910.1450  
Chemical Hygiene Plan  
Right To Know  
Labeling and Safety Data Sheets

- To provide you with the information to help you make knowledgeable decisions about chemical hazards in your workplace.



# Hazard Communication vs Chemical Hygiene Plan vs RTK

## Hazard Communication

Applies that all employees engaged in the handling of chemicals are provided with information about those chemicals.

Scope - communicate workplace chemical hazards and appropriate protective measures to employees

- Written Hazcom plan
- Training of all employees on chemical hazards
- Information on chemical labels
- Safety Data Sheets (SDSs)
- Labeling

## Right To Know

Applies to public employers

- SDS and Hazardous Substance Fact Sheets
- Labeling
- Posting

## Chemical Hygiene Plan

Applies to all employees engaged in the laboratory use of toxic substance

Scope – communicate workplace chemical hazards and appropriate protective measures to employees

- Written chemical hygiene plan (CHP)
- Training of all employees on chemical hazards
- Hazard identification – labels and SDSs
- Labeling
- Responsible personnel – Chemical Hygiene Officer – **The PI**
- Medical consultation and examinations

# Overview of the Hazard Communication and Laboratory Standard

- Developed in 1983.
- Gave employees a “right to know” about chemical hazards
- Required chemical manufacturers to develop container labels and Material Safety Data Sheets (MSDSs)
- Requires employers to:
  - Inventory all hazardous chemicals in the workplace
  - Secure SDSs (formerly MSDSs) for each hazardous chemical
  - Develop a written hazard communication and Chemical Hygiene plan
  - Provide hazard recognition training for each affected employee
  - Label portable containers appropriately
- Changed in 2012 to align with the Globally Harmonized System (GHS)

# Why Did OSHA Align the HCS with GHS?

- Around the world, hazard classification and hazard communication laws are similar in purpose but different in approach.
- Over 1 million hazardous chemicals are used in the United States
- Rationale behind GHS:  
To provide a single, harmonized system to classify chemicals, labels and SDS with the primary benefit of increasing the quality and consistency of information provided to workers, employers and chemical users, worldwide.



# Why is any Standard Necessary?

- To evaluate the hazards of all chemicals imported into, produced, or used in workplaces in the United States
- To prevent or minimize employee exposure to chemicals
- Because chemical over exposure can contribute to serious health effects:
  - o Heart ailments
  - o Burns/rashes
  - o Kidney/lung damage
  - o Sterility
  - o Cancer
  - o Central nervous system damage

# OSHA HazCom Modifications due to GHS (how the MSDS changed to become the SDS)

- Revised labeling provisions that include requirements for:
  - Standardized signal words (Danger or Warning)
  - Pictograms
  - Hazard statements
  - Precautionary statements
- Specified format for safety data sheets in 16 section format
- Revisions to definitions of terms used in the standard and requirements for employee training on labels and Safety Data Sheets (SDS)



# Hazard Communication and Chemical Safety

Chemicals are all around us every day

Chemicals can be:

- o Corrosive
- o Reactive
- o Flammable
- o Explosive
- o Oxidizing
- o Irritant





# Chemical Safety

In many cases, the chemicals you may deal with at work or in the lab are no more dangerous than those you use at home.

But in the workplace:

exposure may be greater,  
concentrations higher,  
exposure time longer:  
potential danger could be greater.



# How do Chemicals Affect the Body?

Methods/observations used to detect presence or release of a hazardous chemical:

- Visual appearance or odor of hazardous chemicals
- Observation of a spill

The signs and symptoms associated with exposures to hazardous chemicals used in the laboratory:

- Headache
- Fever, sweating
- Dizziness and poor balance
- Respiratory distress

# How do Chemicals Enter the Body?

- **The affect a certain chemical has on the body depends on several factors:**
  - The physical form of the chemical
  - How the chemical enters the body
  - The amount of chemical that actually enters the body - the dose
  - How toxic (poisonous) the chemical is
- **Routes of Entry**
  - Ingestion – swallowing the chemical
  - Inhalation – breathing in the chemical
  - Absorption – the chemical soaks through the skin

# Hazards

There are 2 basic types of chemical hazards:

- Physical Hazards
- Health Hazards



The first rule of Chemical safety is...

"Know what you are working with and how to protect yourself and others"

# Physical Hazards

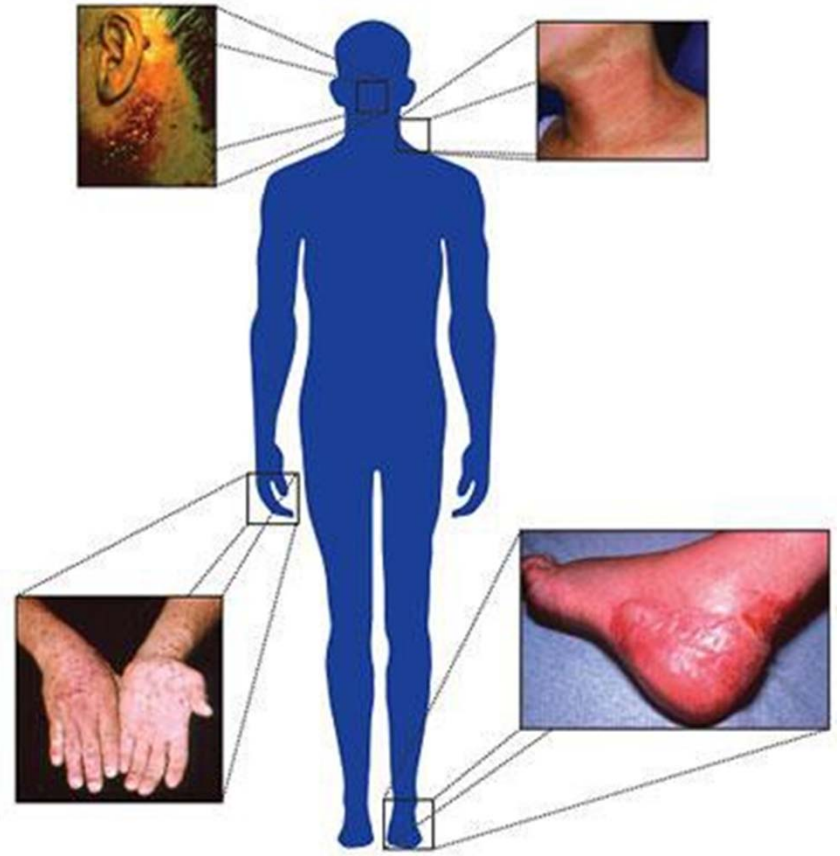
Physical hazards are exhibited by certain chemicals because of their physical properties (e.g. flammability, reactivity, etc.)

These chemicals fall into the following classes:

- o Flammable liquids or solids
- o Combustible liquids
- o Compressed gases
- o Explosives

# Health Hazard

Health hazard - Occurs when a chemical produces an acute or chronic health effect on exposed employees



# Acute Health Effects

- Happens quickly
- High, brief exposure
- Examples:
  - o Acid burns to skin
  - o Ammonia inhalation
  - o Solvent inhalation



# Chronic Health Effects

- May be caused by chemical exposures that do not cause immediate, obvious harm or make you feel sick right away
- May not see, feel, or smell the danger
- Effects are long, continuous and follow repeated long-term exposure; e.g.:
  - o Lung cancer from cigarette smoking
  - o Pneumoconiosis from asbestos, silica



# Keeping it Safe

- Corrosives, solvents and other chemical substances can be potentially dangerous
- Safe handling procedures
  - Read container labels
  - Check SDS(s)
- Never sniff a chemical for identification
- Use appropriate personal protective equipment that is rated for that chemical
- When in doubt contact EHS

# Labels and Warnings

- GHS Pictograms replace the warning diamond labels found on hazardous chemical containers
- The old OSHA standard left labeling up to the chemical manufacturers. The new rules are much more specific
- It is still the chemical manufacturer's or distributor's responsibility to appropriately label the chemical
- The HMIS and NFPA four color diamond does not go away. This information is still needed by emergency responders
- DOT requirements remain unchanged. Outside packaging must be DOT compliant. DOT markings are not required on containers inside a package

# Accident Prevention Signs

- Danger Signs
  - Red, white and black
- Caution Signs
  - Black with yellow letters
- Safety Instruction Signs
  - Green with white letters



# Elements of the New GHS Label Format

- Each label must contain six specified elements
- The elements need not be in any order
- Pictograms provide clear message
- Standardized signal words and precautionary statements bring clarity to the hazard and potential severity of the chemical

# Six Elements of the New GHS Label Format

## The Basic Parts of A GHS-Compliant Label

**1** → **n-Propyl Alcohol**

UN No. 1274  
CAS No. 71-23-8

**2** → **DANGER**

**3** → Highly flammable liquid and vapor. Causes serious eye damage. May cause drowsiness and dizziness.

**4** → Keep away from heat/sparks/open flames/hot surfaces. No smoking. Avoid breathing fumes/mist/vapours/spray. Wear protective gloves/protective clothing/eye protection/face protection. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present. Continue rinsing.

Fill Weight: 18.65 lbs.      Lot Number: B56754434  
Gross Weight: 20 lbs.      Fill Date: 6/21/2013  
Expiration Date: 6/21/2020



**5** → Acme Chemical Company • 711 Roadrunner St. • Chicago, IL 60601 USA • www.acmechem.com • 123-444-5567

See SDS for further information.

**6** →

1. **Product Identifier** - Should match the product identifier on the Safety Data Sheet.
2. **Signal Word** - Either use "Danger" (severe) or "Warning" (less severe)
3. **Hazard Statements** - A phrase assigned to a hazard class that describes the nature of the product's hazards
4. **Precautionary Statements** - Describes recommended measures to minimize or prevent adverse effects resulting from exposure.
5. **Supplier Identification** - The name, address and telephone number of the manufacturer or supplier.
6. **Pictograms** - Graphical symbols intended to convey specific hazard information visually.

## GHS HAZARD PICTOGRAMS

 <p><b>Flame</b></p> <ul style="list-style-type: none"> <li>• Flammables</li> <li>• Emits Flammable Gas</li> <li>• Self Reactives</li> <li>• Pyrophorics</li> <li>• Organic Peroxides</li> <li>• Self-Heating</li> </ul>	 <p><b>Corrosion</b></p> <ul style="list-style-type: none"> <li>• Corrosive to Metals</li> <li>• Skin Corrosion</li> <li>• Serious Eye Damage</li> </ul>
 <p><b>Exploding Bomb</b></p> <ul style="list-style-type: none"> <li>• Explosives</li> <li>• Self Reactives</li> <li>• Organic Peroxides</li> </ul>	 <p><b>Skull &amp; Crossbones</b></p> <ul style="list-style-type: none"> <li>• Acute Toxicity (Severe)</li> </ul>
 <p><b>Flame Over Circle</b></p> <ul style="list-style-type: none"> <li>• Oxidizers</li> </ul>	 <p><b>Health Hazard</b></p> <ul style="list-style-type: none"> <li>• Carcinogen</li> <li>• Respiratory Sensitizer</li> <li>• Reproductive Toxicity</li> <li>• Mutagenicity</li> <li>• Target Organ Toxicity</li> <li>• Aspiration Toxicity</li> </ul>
 <p><b>Gas Cylinder</b></p> <ul style="list-style-type: none"> <li>• Gases Under Pressure</li> </ul>	 <p><b>Exclamation Mark</b></p> <ul style="list-style-type: none"> <li>• Acute Toxicity (Harmful)</li> <li>• Dermal Sensitizer</li> <li>• Skin &amp; Eye Irritation</li> <li>• Narcotic Effects</li> <li>• Respiratory Tract Irritation</li> </ul>
 <p><b>Environment</b></p> <ul style="list-style-type: none"> <li>• Environmental Toxicity</li> </ul>	<p> <input type="checkbox"/> Physical Hazards  <input type="checkbox"/> Physical &amp; Health Hazards  <input type="checkbox"/> Health Hazards  <input type="checkbox"/> Environmental Hazards         </p>

# 9 New GHS Pictograms Align with the 26 Hazard Classifications

Symbol on white background with red square frame

Eight pictograms are required by OSHA

The ninth one dealing with the environment is not within OSHA's jurisdiction

# Health Hazard

Used to describe:

- Carcinogens
- Mutagens
- Reproductive toxicity
- Respiratory sensitizer
- Target organ toxicity
- Aspiration toxicity

Examples: Carbon Monoxide  
Hexanes  
Benzene



# Flame

Describes:

- Flammables (gas, liquid, solid, aerosol)
- Pyrophorics
- Self-heating
- Emits flammable gas
- Self-reactives
- Organic peroxides

Examples: Butane  
Xylene





# Exclamation Mark

Describes:

- Irritant (skin and eye)
- Skin sensitizer
- Acute toxicity (harmful)
- Narcotic effects
- Respiratory tract irritant
- Hazardous to ozone layer (non-mandatory)



Examples: Isopropyl alcohol  
Ethyl alcohol  
Acetone



# Gas Cylinder

Describes:

- Gases under pressure
- Liquified gases
- Refrigerated liquified gases
- Dissolved gases

Examples: Oxygen  
Nitrogen  
Propane  
Argon



# Corrosive

Describes:

- Skin corrosion/burns
- Eye damage
- Corrosive to metals



Examples: Sodium hydroxide,  
Sulfuric acid  
Bleach



# Exploding Bomb

Describes:

- Unstable explosives
- Self-reactives
- Organic peroxide



Examples: Nitroglycerine  
Gunpowder  
Rocket propellants  
Pyrotechnic mixtures  
Ammonium nitrate



# Flame over Circle

Describes:

- Oxidizers



Examples: Sodium nitrate  
Oxygen  
Hydrogen peroxide  
Nitrous oxide



# Skull and Crossbones

Describes:

- Acute toxicity (fatal or toxic)
- Toxic or fatal if inhaled, swallowed or contacted with skin

Examples: Carbon monoxide  
Ammonia  
Acrylonitrile  
Arsenic  
Hydrogen sulfide



# Classification Differences Between NFPA Hazard Rating and GHS Hazard Categories

- The numerical hazard category is generally not listed on the new GHS label format but the hazard category rating should be on the SDS
- HMIS/NFPA uses a 0 to 4 hazard rating, 4 being the most severe
- GHS uses a 1 to 5 hazard category ranking with 1 being the most severe.
- **GHS and NFPA/HMIS ranking is reversed!**



**HMIS**

Health Hazard	0
Fire Hazard	0
Reactivity	0

HMIS/NFPA  
0 = Minimal Hazard  
1 = Slight Hazard  
2 = Moderate Hazard  
3 = Serious Hazard  
4 = Severe Hazard

GHS  
5 = Minimal Hazard  
4 = Slight Hazard  
3 = Moderate Hazard  
2 = Serious Hazard  
1 = Severe Hazard

# Pop Quiz!

- What are the two Signal Words?
- How many pictograms are there?
- How can the information on the label be used to ensure proper storage?
- How can the information on the label be used to quickly find first aid information?
- What does this pictogram represent?





# Labeling

- OSHA is maintaining the approach used in the current HCS that allows employers to use workplace-specific labeling systems as long as they provide the required information.
- At a minimum the label must contain:
  - Product identifier, and
  - Words, pictures, symbols or a combination that provide at least general information regarding the hazards
- NFPA/HMIS Systems
  - (ratings systems v. hazard category)
- Labels must be written in English and prominently displayed



# Label Examples

On containers



On shipping boxes



# SDS

## Safety Data Sheets:

- Developed by chemical manufacturers and Importers
- An SDS must be on hand for each hazardous chemical used
- SDS is for mixtures not individual chemicals in the mixtures

SIGMA-ALDRICH		sigma-aldrich.com
		Material Safety Data Sheet
		Version 4.0 Revision Date 03/14/2010 Print Date 10/08/2010
<b>1. PRODUCT AND COMPANY IDENTIFICATION</b>		
Product name	:	Sulfuric acid
Product Number	:	339741
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+18003255832
Fax	:	+18003255052
Emergency Phone #	:	(314) 776-6555
<b>2. HAZARDS IDENTIFICATION</b>		
<b>Emergency Overview</b>		
<b>OSHA Hazards</b> Target Organ Effect, Highly toxic by inhalation, Corrosive		
<b>Target Organs</b> Teeth, Lungs		
<b>GHS Label elements, including precautionary statements</b>		
Pictogram		
Signal word		Danger
Hazard statement(s)		H303 May be harmful if swallowed. H314 Causes severe skin burns and eye damage. H330 Fatal if inhaled. H402 Harmful to aquatic life.
Precautionary statement(s)		P260 Do not breathe dust/fume/gas/mist/vapours/spray. P280 Wear protective gloves/protective clothing/eye protection/face protection. P284 Wear respiratory protection. P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 Immediately call a POISON CENTER or doctor/physician.
<b>HMS Classification</b>		
Health hazard:		3
Chronic Health Hazard:		*
Flammability:		0
Physical hazards:		2
<b>NFPA Rating</b>		
Health hazard:		3
Fire:		0
Reactivity Hazard:		2
Special hazard:		W
Aldrich - 339741		
Page 1 of 6		

# Safety Data Sheets

1. Identification of the substance or mixture and of the supplier
2. Hazard identification
3. Composition/information on ingredients
4. First aid measures
5. Firefighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure controls/ personal protection
9. Physical and chemical properties
10. Stability and reactivity
11. Toxicological information
12. Ecological information
13. Disposal considerations
14. Transport information
15. Regulatory information
16. Other information including information on preparation and revision of the SDS



# Safety Data Sheet Sections

- Section 1 – Identification
  - Identifies the chemical on the SDS as well as the recommended uses. It also provides the essential contact information of the supplier.
- Section 2 – Hazard(s) Identification
  - Identifies the hazards of the chemical and the appropriate warning information associated with those hazards. This includes:
    - The hazard classification of the chemical (e.g., flammable liquid, category1).
    - Signal word.
    - Hazard statement(s).
    - Pictograms Precautionary statement(s).

# Safety Data Sheet Sections

- Section 3 – Composition/Information on Ingredients
  - Identifies the ingredient(s) contained in the product. This includes information on substances, mixtures, and all chemicals where a trade secret is claimed.
- Section 4 – First Aid Measures
  - Describes the initial care that should be given by untrained responders including recommendations for immediate medical care and special treatment needed.
- Section 5 – Fire-Fighting Measures
  - Provides recommendations for fighting a fire caused by the chemical.



# Safety Data Sheet Sections

- Section 6 – Accidental Release Measures
  - Provides recommendations on the appropriate response to spills, leaks, or releases, including containment and cleanup practices
- Section 7 – Handling and Storage
  - Provides guidance on the safe handling practices and conditions for safe storage of chemicals
- Section 8 – Exposure Controls/Personal Protection
  - Indicates the exposure limits, engineering controls, and personal protective measures that can be used to minimize worker exposure. This includes recommendations for personal protective equipment (PPE).
- Section 9 – Physical and Chemical Properties
  - Identifies physical and chemical properties associated with the substance or mixture

# Safety Data Sheet Sections

- Section 10 – Stability and Reactivity
  - Describes the reactivity hazards of the chemical and the chemical stability information
- Section 11 – Toxicological Information
  - Identifies toxicological and health effects information. Provides information on the likely routes of exposure (inhalation, ingestion, skin and eye contact) and a description of the symptoms.
- Section 12 – Ecological Information (non-mandatory)
  - Provides information to evaluate the environmental impact of the chemical(s) if it were released to the environment.
- Section 13 – Disposal Considerations (non-mandatory)
  - Provides guidance on proper disposal practices, recycling or reclamation of the chemical(s) or its container, and safe handling practices.



# CHEMICAL PURCHASES

<http://www.njit.edu/purchasing/manual/index.php>

- Department enters and approves a purchase requisition.
- Reviews are done by the NJIT Accounting Office, Office of Grants & Contracts and EHS
- The responsible individuals submit their approval.
- After all approvals are obtained, the requisition is reviewed by Purchasing and converted to a purchase order.
- The purchase order is sent to the vendor.
- The vendor ships the material to the Shipping and Receiving Department.
- When the material arrives at the Loading Dock, Shipping and Receiving personnel will deliver it to the client department.

# **EHS Review and Approval of Chemical Purchases**

## **Material Hazards**


**Personal Safety Equipment- all staff MUST use the following PPE**

**Training- all staff MUST have received the following specialize safety training**

**Laboratory Safety Equipment requirements- prior to storage or use of this material, the following safety equipment MUST be in place and working properly**

**Disposal Requirements- the following procedures MUST be followed for the proper disposal of this material.**

# Pop Quiz!

- How many sections are there in a Safety Data Sheet?
- Is the name of chemical manufacturer or distributor on the SDS?
- In which SDS Section would you find this pictogram? 
- What are some signs of chemical exposure?

# Summary

- All facilities should have a written plan in a location that is accessible
- All hazardous products should be labeled and everyone working in the area should be aware of what and where they are
- SDSs should be available and accessible for all hazardous products
- Understand what the new pictograms represent
- Understand the format of the new labels and what each required section means
- Understand the new SDS

<http://www.njit.edu/environmentalsafety>