HAZARD COMMUNICATION PROGRAM

Department of Physics and Astronomy
Welcome to the Hazard Communication Program training module for the Department of Physics and Astronomy. This training program consists of five sections and will take you approximately 30 minutes to complete.

The Purpose of this training is:

• To provide employees with the knowledge to understand the hazards of the chemicals they work with

• To provide a safer and healthier workplace for all employees

• To ensure regulatory compliance with the State and Federal Right to Know Law 29 CFR 1910.1200

All employees are covered by the Hazard Communication Program
Safety is the responsibility of everyone, but there are specific responsibilities at the employee, department and university level.
Responsibilities - Employee

- To use the available information and stay informed about hazards in the work area
- To use the safety techniques and hygiene practices as a routine part of daily activities
- To participate in the appropriate training sessions
The department provides Designated Trained Individuals (DTIs) whose duties include:

- Ensuring chemical inventories and employee exposure records are maintained
- Ensuring Safety Data Sheets (SDSs) for work areas are up to date
- Conducting employee training and keeping records of training
- Ensuring safe and healthful work conditions are maintained
- Contacting REM with questions

Department DTIs

- Boshra Afra, PHYS 217D, 494-3001, afra@purdue.edu
- Keith Schmitter, PHYS 001, 494-5531, schmittk@purdue.edu
- Aaron Mull, PHYS 032, 494-5533, acmull@purdue.edu
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Purdue Radiological and Environmental Management (REM)  [www.purdue.edu/rem](http://www.purdue.edu/rem)

- Trains Designated Trained Individuals (DTIs)
- Conducts Work Area Audits
- Assists with MSDS (or SDS) acquisition
- Program Oversight
1. To be informed about the known health and physical hazards in the work area
2. To be trained to use proper safety techniques and hygiene practices
3. To inform the DTI about accidents or hazardous situations in the work area without fear of repercussions from your supervisor or the university
4. To file a formal complaint with IOSHA
   Indiana Department of Labor
   Indiana State Government Center South
   Indianapolis, IN 46204-2287
   (317) 232-2655
   www.in.gov/dol/2733.htm
The department is required to maintain a hard copy of its Hazard Communication Program. You can find copies in rooms S153, 144, 162, 217D, and 370.
SECTION 1

Building Emergency Plan
The department has employees in 3 buildings on campus:

1. Physics Building (PHYS)
2. Birck Nanotechnology Center (BRK)
3. Wetherill Building (WTHR)

Copies of each Building Emergency Plan can be found at http://www.physics.purdue.edu/resources/safety.html.

This training module will address only the PHYS Building Emergency Plan (BEP).
INTRODUCTION

The BEP is designed to provide students, faculty, staff and visitors basic warning notification system, shelter-in-place and building evacuation emergency information for natural and human-caused incidents.

You should also be familiar with the Purdue Emergency Procedures Guide at http://www.purdue.edu/emergency_preparedness/.

If you have any questions about the BEP, contact the PHYS building deputy (Keith Schmitter, schmittk@purdue.edu) or the Campus Emergency Preparedness and Planning Office at (765) 494-0446.
Response to Alarms

Remember, when you hear:

- All Hazards Sirens immediately seek shelter (Shelter-In-Place) in a safe location within closest facility.
- Fire Alarms immediately evacuate the building and move to a safe location.

In both cases, you should seek additional clarifying information by all possible means... Purdue Homepage, TV, radio, email, etc.
If you work in the PRIME Lab area, you may also hear other alarms.

- **PRIME Lab RADIATION ALARMS (S182 and S171):** Quickly move out of the immediate area of the sensor that is in alarm condition. Report this condition to the accelerator operator.

- **PRIME Lab OXYGEN DEFICIENCY ALARMS (S182):** These alarms have an audible warning plus a flashing blue light. In the event of an alarm quickly move out of the S-182 area and evacuate the rest of the sub-basement level. A member of the engineering and operations staff will check the validity of the alarm with a portable oxygen monitor and other means. If the alarm is found to be valid, the remainder of PRIME Lab must be evacuated, and evacuation signs should be placed on both PRIME Lab entrances. All evacuated personnel should meet in the hallway near room 1 in the Physics building.

- **PRIME Lab SUMP PUMP ALARM** Contact Physical Facilities immediately. No evacuation is required.
When a fire alarm sounds, evacuate the building promptly using the nearest designated exit routes.

Take keys, coats, ID, or any other critical personal items with you.

Close doors as rooms are vacated.

Assist those who need help, but do not put yourself at risk attempting to rescue trapped or injured individuals. Note their location and inform emergency responders.

Use stairs only. **NO ELEVATORS.**

Go to the Emergency Assembly Area.

Follow instructions of the building deputy or fire and police personnel.

**DO NOT** re-enter the building until authorized to do so by fire or police personnel.

You may briefly delay evacuating if you need time to shut down electrical and other equipment, especially any that involves flame, explosive vapors, or hazardous materials.
Primary location: In order not to interfere with emergency personnel, proceed to the west portion of the Engineering Mall and assemble in the area between Hovde Hall, Schleman Hall and the fountain. **DO NOT assemble between the building and Northwestern Avenue or between the building and Forney Hall, Hampton Hall, Armstrong Hall.**

Secondary location (in case of inclement weather): MSEE Atrium, ground floor.
You may be required to Shelter In Place for events such as:

- Tornado warning or other severe weather events.
- Hazardous materials release.
- Active shooter, building intruder, or civil disturbance.
- As directed by police personnel for any other situation that requires you to find protection within a building.

Purdue ALERT, the University’s emergency warning system will be used to announce the “shelter in place” situation.
SHELTER IN PLACE – SEVERE WEATHER

• Proceed to the basement or subbasement.
• Position yourself in the safest portion of the area away from glass.
• Be prepared to kneel facing a wall and cover your head.
• Any occupant who encounters a student or visitor should direct them to take appropriate actions.
• Assist physically disabled individuals as possible.
• Try to obtain additional clarifying information by all possible means (Purdue homepage, radio, email, etc.).
If you are “sheltering” due to a hazardous materials (HAZMAT) accidental release of toxic chemicals the air quality may be threatened and sheltering in place keeps you inside an area offering more protection. For a HAZMAT situation you should, if possible, take the following actions:

• Close all windows and doors.
• Move to the shelter in place location.
• Do not go outside or attempt to drive unless you are specifically instructed to evacuate.
• Do not use elevators as they may pump air into or out of the building.
• Any occupant who encounters a student or visitor should direct them to take appropriate actions.
• Any occupant that encounters a physically disabled individual should assist them if possible.
• Try and obtain additional clarifying information by all possible means (e.g. Purdue Homepage, TV, radio, email, etc.)
• (PRIME Lab Only) Do NOT operate the PRIME Lab emergency purge system since this will draw additional outside air.
<table>
<thead>
<tr>
<th>1) RUN</th>
<th>2) HIDE</th>
<th>3) FIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>If there is an accessible escape path, attempt to evacuate the premises</td>
<td>If evacuation is not possible, find a place to hide where the active shooter is less likely to find you.</td>
<td>As a last resort, and only when your life is in imminent danger, attempt to disrupt and/or incapacitate the active shooter</td>
</tr>
<tr>
<td>• Have an escape route in mind</td>
<td>• Your hiding place should be out of the shooter’s view and provide protection if shots are fired in your direction.</td>
<td>• Act as aggressively as possible against him/her</td>
</tr>
<tr>
<td>• Evacuate regardless or whether others agree to follow</td>
<td>• Lock and/or blockade the door.</td>
<td>• Throw items and improvise weapons</td>
</tr>
<tr>
<td>• Leave belongings behind</td>
<td>• Silence your cell phone and other noise sources (radio, tv, computer).</td>
<td>• Yell</td>
</tr>
<tr>
<td>• Help others to escape if possible</td>
<td>• Hide behind large items</td>
<td>• Commit to your actions</td>
</tr>
<tr>
<td>• Warn others about entering the area</td>
<td>• Remain quiet</td>
<td></td>
</tr>
<tr>
<td>• Keep hands visible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Follow all instructions of any police</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Do not attempt to moved wounded people</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Call 911 when safe</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SECTION 2

Hazardous Characteristics and Effects of Chemicals
Almost all employee at Purdue will encounter chemicals while performing their jobs.

A chemical is considered hazardous if it possesses one or more health or physical hazardous characteristics.

Chemical health effects can be of two types:
- Acute health effect - the body reacts immediately to the exposure (example: ammonia vapor exposure causes immediate irritation to the eyes).
- Chronic health effects - the body reacts months or years following the exposure (example: methylene chloride may cause liver disease or cancer after many years of exposure).

### Types of Chemical Hazards

<table>
<thead>
<tr>
<th>Health Hazards</th>
<th>Physical Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acutely Toxic</td>
<td>Explosives</td>
</tr>
<tr>
<td>Corrosive/Irritant</td>
<td>Reactive – self, air, or water</td>
</tr>
<tr>
<td>Sensitizer</td>
<td>Flammable</td>
</tr>
<tr>
<td>Toxic – specific organs</td>
<td>Oxidizers</td>
</tr>
<tr>
<td>Carcinogenic</td>
<td>Cryogenic liquids</td>
</tr>
<tr>
<td>Reproductive toxin</td>
<td>Gases under pressure</td>
</tr>
<tr>
<td>Asphyxiant</td>
<td>Corrosive to metals</td>
</tr>
<tr>
<td>Aspiration hazard</td>
<td></td>
</tr>
</tbody>
</table>
Chemicals must gain entry into the body to cause harm

There are four potential routes of exposure to a chemical

Most common
1. Inhalation – taken into the body through the lungs
2. Absorption – taken into the body through the skin

Less common
3. Ingestion – taken into the body orally
4. Injection – taken into the body through broken skin

We can protect ourselves from most chemical exposures by handling chemicals in well ventilated areas and wearing personal protective equipment (PPE).
Symptoms of chemical exposure vary by chemical but common signs on chemical over-exposure include:

- Dizziness or light-headedness
- Difficulty breathing
- Coughing or wheezing
- Teary eyes/runny nose
- Nausea
- Skin reddening, irritation or blistering

If you develop symptoms while working with a chemical:

- **Stop work**
- **Place the chemical in storage and leave the area**
- **Inform your supervisor and seek medical assistance if necessary**
- **Follow up with REM**
Personnel from REM routinely inspect operations handling or storing hazardous chemicals.

Estimates of employee exposures are made from these observations to minimize exposure.

Formal air monitoring has been conducted in many locations where hazardous chemicals are routinely handled.

REM will evaluate exposures of employees who
  • Suspect and report that they have been overexposed to a toxic chemical
  • Are displaying symptoms of overexposure

Concerns about chemical exposures should be brought to the attention of REM and your supervisor immediately.
Medical consultation

Medical attention and follow-up examinations are provided to individuals who:

- develop signs or symptoms of exposure to a toxic chemical
- were exposed to a toxic chemical during a chemical incident

Individuals with serious or life-threatening injuries should immediately dial 911 for assistance.

Emergency treatment is provided at:

- Franciscan St. Elizabeth Health
- IU Health Arnett Hospital Emergency Room

Non-emergency treatment is available through:

- Regional Occupational Care Center (ROCC)
- IU Health Arnett Occupational Services
SECTION 3

Chemical Container Labeling and Safety Data Sheets
INTRODUCTION

Chemical hazard information can be found on the Safety Data Sheet (SDS) and the product label.

Before handling a hazardous chemical you must know the appropriate safeguards to follow including how to:

- Properly store and handle the chemical
- Respond to a spill or release
- Dispose of the chemical

Your supervisor, lab manager, or other responsible individual will review these procedures with you.

Especially important is knowing the appropriate Personal Protective Equipment (PPE) to wear and any special ventilation requirements necessary while handling the chemical.
Beginning in 2015, OSHA regulations required safe handling information to be printed on all hazardous chemical container labels. This is required by the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).
Fun Safety Fact: Hand sanitizer has an SDS!

In addition to the label, the SDS is your best source for information about the chemical’s hazardous properties, appropriate handling and storage practices and how to respond to exposure or emergency situations.
For any given chemical, every manufacturer’s or distributor’s label will contain exactly the same information:

1. **Product identifier**
2. **Signal word**
3. **Hazard statements**
4. **Precautionary statements**
5. **Supplier identification**
6. **Pictograms**

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**The Basic Parts of A GHS-Compliant Label**

- **n-Propyl Alcohol**
  - UN No.: 1274
  - CAS No.: 71-23-8

- **DANGER**
  - Highly flammable liquid and vapor. Causes serious eye damage. May cause drowsiness and dizziness.
  - Keep away from heat/sparks/open flames/tot surfaces. No smoking. Avoid breathing fumes/media/vapors/gases. 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.

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

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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.

Sample label courtesy of Weber Packaging Solutions - www.weberpackaging.com
A pictogram describes a chemical’s hazardous characteristic with an image.
Health hazard

This pictogram is reserved for chemical containers that cause the most severe adverse health effects to specific body organs or systems.

It includes the following categories of health hazards:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcinogen</td>
<td>May cause cancer</td>
</tr>
<tr>
<td>Mutagenicity</td>
<td>May cause mutations in future generations</td>
</tr>
<tr>
<td>Reproductive Toxicity</td>
<td>May interfere with sexual function, fertility, and development of offspring</td>
</tr>
<tr>
<td>Respiratory Sensitizer</td>
<td>May cause allergy or asthma symptoms or breathing difficulties</td>
</tr>
<tr>
<td>Target Organ Toxicity</td>
<td>May cause damage to specific organs but is not lethal</td>
</tr>
<tr>
<td>Aspiration Toxicity</td>
<td>May cause chemical pneumonia or pulmonary injury or death</td>
</tr>
</tbody>
</table>
Flame

This pictogram is placed on chemical containers that may start or contribute to a fire. It includes the following categories of materials:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammables</td>
<td>easily ignited, burns quickly</td>
</tr>
<tr>
<td>Pyrophorics</td>
<td>spontaneously igniting in air or water reactive</td>
</tr>
<tr>
<td>Self-Heating</td>
<td>spontaneously heats in air but not pyrophoric</td>
</tr>
<tr>
<td>Emits Flammable Gas</td>
<td>reacts with water to emit a flammable gas</td>
</tr>
<tr>
<td>Self Reactives</td>
<td>liable to undergo strongly exothermic decomposition but not explosive</td>
</tr>
<tr>
<td>Organic Peroxides</td>
<td>derivatives of hydrogen peroxide that undergo exothermic decomposition but not explosive</td>
</tr>
</tbody>
</table>
Exclamation mark

This pictogram indicates materials that are health hazards that can harm the body in specific ways. Items in this category are much less toxic than items that use the skull and crossbones pictogram. It includes the following categories of materials:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irritant (skin &amp; eyes)</td>
<td>may cause reversible inflammation or other discomfort to the body</td>
</tr>
<tr>
<td>Skin Sensitizer</td>
<td>may induce an allergic response following skin contact</td>
</tr>
<tr>
<td>Acute Toxicity</td>
<td>adverse effects occurring following short term exposure to a substance</td>
</tr>
<tr>
<td>Narcotic Effects</td>
<td>central nervous system depression (drowsiness, loss of reflexes or coordination)</td>
</tr>
<tr>
<td>Respiratory Tract Irritant</td>
<td>cough, pain, choking, and breathing difficulties</td>
</tr>
<tr>
<td>Hazardous to Ozone Layer</td>
<td>not mandatory</td>
</tr>
</tbody>
</table>
Gas cylinder

This pictogram is placed on containers of gases under at least 29 pounds per square inch of pressure.
Corrosion

This pictogram indicates materials that are corrosive. It includes the following categories of materials:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin Corrosion / Burns</td>
<td>may cause irreversible damage to the skin</td>
</tr>
<tr>
<td>Eye Damage</td>
<td>may cause tissue damage in the eye that is not fully reversible</td>
</tr>
<tr>
<td>Corrosive to Metals</td>
<td>material which by chemical action will damage or destroy metals</td>
</tr>
</tbody>
</table>
Explosives

Materials capable of chemical reactions producing gases that damage surroundings

Self-Reactives

unstable substances liable to undergo strongly exothermic reactions

Organic Peroxides

derivatives of hydrogen peroxide that may undergo exothermic decomposition
Flame over circle

This pictogram is placed on containers of chemicals that are oxidizers (chemicals that when mixed or in contact with combustible materials may cause a fire or explosion, or intensify a fire).

These materials may be solid, liquid, or gas.
Skull and crossbones

This pictogram is placed on chemical containers that are extremely toxic (fatal) to moderately acutely toxic. It includes materials in which adverse effects occur following short term exposure to the substance. These materials are more toxic that the items given the Exclamation Mark pictogram.
Environmental

This pictogram is placed on containers of chemicals that represent a hazard to the aquatic environment and does not convey any workplace related hazard information.

It is a non-mandatory classification since OSHA does not have regulatory authority to address environmental concerns. It is included to support other regulatory agencies like the EPA.
Most chemical hazards are represented by pictograms on the new labels, but not all.

These hazards include:

1. chemicals on the lowest end of the hazard spectrum in a hazard class
2. an OSHA defined hazard of which there are two - combustible dusts and an asphyxiant
The signal word is a label element that conveys the severity of the hazard when handling the chemical.

There are two signal words used on chemical labels:

**Danger** - used for the more severe hazards

**Warning** - used for less severe hazards

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**METHANOL**

Highly flammable liquid and vapour. Toxic if swallowed, in contact with skin or if inhaled. Causes damage to organs.


IF SWALLOWED: immediately call a POISON CENTER or doctor/physician.

IF exposed: Call a POISON CENTER or doctor/physician.

See Material Safety Data sheet for further details regarding safe use of this product.
A Globally Harmonized System (GHS) Label contains one or more hazard statements to convey information about the chemical’s hazardous characteristics and degree of risk.

A hazard statement has been assigned to each of OSHA’s chemical hazard categories and must appear on the label.

**Examples of Hazard Statements**

**Statement associated with the MOST hazardous chemical in a category**
- Extremely flammable liquid and vapor
- Fatal if swallowed
- Causes severe skin burns and eye damage

**Statement associated with the LEAST hazardous chemical in a category**
- Combustible liquid
- Harmful if swallowed
- Cause eye irritation
The second major type of information found on labels is precautionary or safe handling information. Precautionary statements provide four types of information:

- how to avoid the hazard when handling the chemical
- how to properly store the chemical
- what to do if the hazard is not avoided
- how to dispose of the chemical

Each chemical hazard category defined by OSHA has been assigned specific precautionary statements and these will appear on the label.

**Methanol**

**DANGER**

- Highly flammable liquid and vapor. To avoid fire and explosion, keep away from sparks, flames, and other ignitable materials. Keep container tightly closed.
- May cause blindness if eye solutions are not stored properly. Do not use plastic containers to store eye solutions.

**RESPONSE**

- If swallowed: Immediately call a poison center. Rinses mouth. If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a poison center.
- If on skin (or hair): Wash with plenty of water, and soap if available. Call a poison center if you feel unwell.

**WARNING:** This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.
Some precautionary statements are conditional or depend on some condition in the workplace.

An example of a conditional statement is:

“If inadequate ventilation, wear respiratory protection”

*If you find conditional statements on labels make sure you understand them before proceeding.*

If you are unsure how to respond to a conditional statement, consult the chemical’s safety data sheet, or ask your supervisor, REM, or other knowledgeable person.
Other precautionary statements will refer you to the safety data sheet, SDS, for information.

Examples found on labels of chemicals with cancer causing potential are:

• “Obtain special instructions before use”
• “Do not handle until all safety precautions have been read and understood”

Again, consult the chemical’s safety data sheet or ask your supervisor, REM, or other knowledgeable person before handling this type of chemical.
Most chemicals belong to more than one hazard category and the label will have multiple pictograms, hazard statements and precautionary statements.

Labels will have one signal word which will represent the most hazardous characteristic associated with the chemical.

If acute toxicity of the chemical is not known for the chemical, this will be stated on the label.
If you transfer a hazardous chemical from a stock container to a secondary container, you must transfer some basic information to the new container.

This includes:

- The name of the chemical or chemical product
- The hazardous properties associated with the chemical

The ONLY EXCEPTION to this requirement is if the chemical will be immediately used by the individual making the transfer.

REM will provide blank secondary container labels on request.
Safety Data Sheets (SDSs) are multi-page documents that contain a lot more health and safety information about a chemical than the label. These replace the old Material Data Safety Sheets (MSDS) that may still be present in several work areas.

You can locate the safety data sheet for a chemical by matching up the name on the label with the name on the safety data sheet.

The health and safety information placed in safety data sheets, as well as the layout of this information, is now specified by federal regulation and as of 2015 will be consistent across all manufacturers and distributors.
Safety data sheets have sixteen sections with sections 1 through 11 providing health and safety information particularly useful to handlers of chemicals. This training will take you through each section of a SDS for Methanol.

**New Safety Data Sheet (SDS) Format**

- Section 1, Identification
- Section 2, Hazard(s) Identification
- Section 3, Composition/Information on Ingredients
- Section 4, First Aid Measures
- Section 5, Fire Fighting Measures
- Section 6, Accidental Release Measures
- Section 7, Handling and Storage
- Section 8, Exposure Controls/Personal Protection
- Section 9, Physical and Chemical Properties
- Section 10, Stability and Reactivity
- Section 11, Toxicological Information
- Section 12, Ecological Information
- Section 13, Disposal Considerations
- Section 14, Transport Information
- Section 15, Regulatory Information
- Section 16, Other Information
### Section 1. Identification

<table>
<thead>
<tr>
<th>GHS product identifier</th>
<th>: Methanol (Methyl Alcohol)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical name</td>
<td>: methanol</td>
</tr>
<tr>
<td>Other means of</td>
<td>: Methyl alcohol</td>
</tr>
<tr>
<td>identification</td>
<td></td>
</tr>
<tr>
<td>Product use</td>
<td>: Synthetic/Analytical chemistry.</td>
</tr>
<tr>
<td>Synonym</td>
<td>: Methyl alcohol</td>
</tr>
<tr>
<td>SDS #</td>
<td>: 001065</td>
</tr>
<tr>
<td>Supplier's details</td>
<td>: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253</td>
</tr>
</tbody>
</table>

**Emergency telephone number (with hours of operation)**: 1-866-734-3438

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**Remember, the name of the label will always match the name on the SDS.**
The information in Section 2 is exactly as the same as the information placed on the label.
## SDS SECTION 3 – COMPOSITION

### Section 3. Composition/information on ingredients

**Substance/mixture**: Substance

**Chemical name**: methanol

**Other means of identification**: Methyl alcohol

**CAS number/other identifiers**

<table>
<thead>
<tr>
<th>CAS number</th>
<th>Product code</th>
</tr>
</thead>
<tbody>
<tr>
<td>67-56-1</td>
<td>001065</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>%</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>methanol</td>
<td>100</td>
<td>67-56-1</td>
</tr>
</tbody>
</table>

If a substance is not listed because a trade secret is claimed, it will be noted.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.
This section describes the initial care that should be given by untrained responders.
### SDS Section 5 – Fire-fighting measures

**Extinguishing media**
- **Suitable extinguishing media**: Use dry chemical, CO₂, water spray (fog) or foam.
- **Unsuitable extinguishing media**: Do not use water jet.

**Specific hazards arising from the chemical**
- Highly flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

**Hazardous thermal decomposition products**
- Decomposition products may include the following materials:
  - Carbon dioxide
  - Carbon monoxide

**Special protective actions for fire-fighters**
- Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

**Special protective equipment for fire-fighters**
- Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
**SDS SECTION 6 – ACCIDENTAL RELEASE**

**Section 6. Accidental release measures**

**Personal precautions, protective equipment and emergency procedures**

- **For non-emergency personnel:** No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No fires, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

- **For emergency responders:** If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental precautions:** Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

**Methods and materials for containment and cleaning up**

- **Small spill:** Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

- **Large spill:** Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, watercourses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Recommendations on the appropriate response to spills, leaks, or releases, including containment and cleanup practices that prevent or minimize exposure to people and damage to property or the environment. It may also include recommendations that distinguish between responses for large and small spills where the spill volume has a significant impact on the hazard.
# Section 7. Handling and storage

## Precautions for safe handling

### Protective measures
- Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

### Advice on general occupational hygiene
- Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

## Conditions for safe storage, including any incompatibilities
- Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.
# SDS SECTION 8: EXPOSURE CONTROL

## Section 8. Exposure controls/personal protection

### Control parameters

<table>
<thead>
<tr>
<th>Occupational exposure limits</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingredient name</td>
<td></td>
</tr>
<tr>
<td>methanol</td>
<td>ACGIH TLV (United States, 3/2012). Absorbed through skin. STEL: 325 mg/m³ 15 minutes. STEL: 250 ppm 15 minutes. TWA: 250 mg/m³ 8 hours. TWA: 200 ppm 8 hours. NIOSH REL (United States, 1/2013). Absorbed through skin. STEL: 325 mg/m³ 15 minutes. STEL: 250 ppm 15 minutes. TWA: 260 mg/m³ 10 hours. TWA: 200 ppm 10 hours. OSHA PEL (United States, 6/2010). TWA: 250 mg/m³ 8 hours. TWA: 200 ppm 8 hours. OSHA PEL 1989 (United States, 3/1989). Absorbed through skin. STEL: 325 mg/m³ 15 minutes. STEL: 250 ppm 15 minutes. TWA: 250 mg/m³ 8 hours. TWA: 200 ppm 8 hours.</td>
</tr>
</tbody>
</table>

### Individual protection measures

**Eye/face protection**: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mist, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

**Skin protection**: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

**Hand protection**: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

**Body protection**: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Other skin protection**: Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

**Respiratory protection**: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
The physical and chemical properties of a chemical is very helpful in estimating the hazard associated with handling a chemical.
# Section 10. Stability and reactivity

<table>
<thead>
<tr>
<th><strong>Reactivity</strong></th>
<th>No specific test data related to reactivity available for this product or its ingredients.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chemical stability</strong></td>
<td>The product is stable.</td>
</tr>
<tr>
<td><strong>Possibility of hazardous reactions</strong></td>
<td>Under normal conditions of storage and use, hazardous reactions will not occur.</td>
</tr>
<tr>
<td><strong>Conditions to avoid</strong></td>
<td>Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.</td>
</tr>
<tr>
<td><strong>Incompatibility with various substances</strong></td>
<td>Extremely reactive or incompatible with the following materials: oxidizing materials.</td>
</tr>
<tr>
<td><strong>Hazardous decomposition products</strong></td>
<td>Under normal conditions of storage and use, hazardous decomposition products should not be produced.</td>
</tr>
<tr>
<td><strong>Hazardous polymerization</strong></td>
<td>Under normal conditions of storage and use, hazardous polymerization will not occur.</td>
</tr>
</tbody>
</table>
Information is provided on the likely routes of exposure, a description of the immediate, and long-term effects of exposure, the symptoms of exposure and numerical measures of acute toxicity. It will also note if the substance has been identified as a known or potential carcinogen or is a reproductive toxin.
Section 12. Ecological information

**Toxicity**
Not available.

**Persistence and degradability**
Not available.

**Bioaccumulative potential**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogPow</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>methanol</td>
<td>-0.77</td>
<td>&lt;10</td>
<td>low</td>
</tr>
</tbody>
</table>

**Mobility in soil**

- **Soil/water partition coefficient (K<sub>OC</sub>)**: Not available.

**Other adverse effects**: No known significant effects or critical hazards.

The information found in Sections 12 to 16 is not related to handling the chemical safely.
Section 13. Disposal considerations

Disposal methods: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS #</th>
<th>Status</th>
<th>Reference number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methanol (I); Methyl alcohol (I)</td>
<td>67-56-1</td>
<td>Listed</td>
<td>U154</td>
</tr>
</tbody>
</table>
## SDS SECTION 14 - TRANSPORT

### Section 14. Transport information

<table>
<thead>
<tr>
<th></th>
<th>DOT</th>
<th>TDG</th>
<th>Mexico</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UN number</strong></td>
<td>UN1230</td>
<td>UN1230</td>
<td>UN1230</td>
<td>UN1230</td>
<td>UN1230</td>
</tr>
<tr>
<td><strong>UN proper shipping name</strong></td>
<td>METHANOL</td>
<td>METHANOL</td>
<td>METHANOL</td>
<td>METHANOL</td>
<td>METHANOL</td>
</tr>
<tr>
<td><strong>Transport hazard class(es)</strong></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3 (6.1)</td>
<td>3 (6.1)</td>
</tr>
<tr>
<td><strong>Packing group</strong></td>
<td>II</td>
<td>II</td>
<td>II</td>
<td>II</td>
<td>II</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
<td>Reportable quantity: 5000 lbs / 2270 kg; Package sizes shipped in quantities less than the product reportable quantity are not subject to the IRC (importable quantity) transportation requirements.</td>
<td>Explosive Limit and Limited Quantity Index:</td>
<td>Passenger Carrying:</td>
<td>explosive limit and limited quantity index:</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Limited quantity: 0 lbs</td>
<td>-</td>
<td>Read or Roll Index:</td>
<td>43</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>-</td>
<td>Special provisions:</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Packaging Instruction:</td>
<td>Passenger and Cargo Aircraft:</td>
<td>-</td>
<td>Quantity limitation:</td>
<td>-</td>
</tr>
<tr>
<td>Passenger aircraft:</td>
<td>-</td>
<td>Cargo Aircraft Only:</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cargo aircraft:</td>
<td>-</td>
<td>Limited Quantities - Passenger Aircraft:</td>
<td>0 lbs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Quantity limitation:</td>
<td>0 L</td>
<td>Limited Quantities - Cargo Aircraft:</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Special provisions:</td>
<td>43.1, 1.F2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

**Special precautions for user**: Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**: Not available.
Section 15. Regulatory information

### U.S. Federal regulations
- TSCA (b)(5) CDR Exempt/Partial exemption: Not determined
- United States inventory (TSCA (b)(9)): This material is listed or exempted.

### Clean Air Act Section 112
- (b) Hazardous Air Pollutants (HAPs)
  - Clean Air Act Section 802: Not listed
  - Clean Air Act Section 802 Class I Substances: Not listed
  - Clean Air Act Section 802 Class II Substances: Not listed
  - DEA List I Chemicals (Precursor Chemicals): Not listed
  - DEA List II Chemicals (Essential Chemicals): Not listed

### SARA 302/304
- Composition/Information on ingredients:
  - SARA 304 RQ: Not applicable.
  - SARA 311/312 Classification: Not listed.

### SARA 313
- Product name: Methanol
- CAS number: 67-56-1
- Supplier notification: Methanol
- CAS number: 67-56-1

### International regulations
- Canada Inventory
- International lists:
  - Australia Inventory (AICS): This material is listed or exempted.
  - China inventory (ECDG): This material is listed or exempted.
  - Japan inventory: This material is listed or exempted.
  - Korea inventory: This material is listed or exempted.
  - Malaysia Inventory (EHS Register): Not determined.
  - New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
  - Philippines inventory (PICCS): This material is listed or exempted.
  - Taiwan inventory (CSNI): Not determined.

### Chemical Weapons
- Convention List Schedule I Chemicals: Not listed.
- Convention List Schedule II Chemicals: Not listed.

### WHMIS (Canada)
- Class B-2: Flammable liquid
  - Class D-19: Material causing immediate and serious toxic effects (Toxic).
  - Class D-2A: Material causing other toxic effects (Vety toxic).
  - Class D-39: Material causing other toxic effects (Toxic).

### CEPA toxic substances:
- This material is not listed.

### Canadian ART:
- This material is not listed.

### Canadian NTPR:
- This material is not listed.

### Ontario Designated Substances:
- This material is not listed.

### Quebec Designated Substances:
- This material is not listed.

### State regulations
- Massachusetts: This material is listed.
- New York: This material is listed.
- New Jersey: This material is listed.
- Pennsylvania: This material is listed.

**California Prop. 65**

**WARNING:** This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.
Section 16. Other Information

**Canada Label requirements**
- Class B-2: Flammable liquid
- Class D-1B: Material causing immediate and serious toxic effects (Toxic).
- Class D-2A: Material causing other toxic effects (Very toxic).
- Class D-2B: Material causing other toxic effects (Toxic).

**Hazardous Material Information System (U.S.A.)**

<table>
<thead>
<tr>
<th>Health</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>3</td>
</tr>
<tr>
<td>Physical hazards</td>
<td>0</td>
</tr>
</tbody>
</table>

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6888.

The customer is responsible for determining the PPE code for this material.

**National Fire Protection Association (U.S.A.)**

- Health: 5
- Flammability: 3
- Instability/Reactivity: 0
- Special:

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.
Safety data sheets must be completely filled out - none of the required information may be left blank.

When a preparer does not find relevant information for any required element, the safety data sheet must state “no applicable information found.”
Safety Data Sheets should be available in your work area, with REM or accessible from a computer.

• A list of the hazardous chemicals you handle as part of your job is maintained in your work area.

• Safety data sheets for these chemicals are available in your work area or from your supervisor.

• The REM office can assist you locate information on the hazards and safe handling practices associated with the specific chemicals.

IF YOU CAN’T FIND AN SDS, ASK.
Before working with a chemical:

- You must be aware of the chemical hazards associated with it and how to minimize your exposure.
- Perform a hazard assessment to evaluate the potential for exposures and identify appropriate exposure controls. Your supervisor or REM can assist with this assessment.

If you have questions about the proper handling of a hazardous chemical, contact your supervisor or REM.
SECTION 4

Controlling Physical and Health Hazards
There are a number of ways that you can safeguard your health and physical safety when using hazardous materials. These measures include:

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product substitution</td>
<td>Can you use a chemical that does the same job, but is less toxic?</td>
</tr>
<tr>
<td>Engineering controls</td>
<td>Know when to work in a fume hood or a glove box.</td>
</tr>
<tr>
<td>Personal protective equipment</td>
<td>Masks, eye protection, gloves, aprons, and other protective equipment and clothing are designed to protect you while you work. USE THEM!</td>
</tr>
</tbody>
</table>
There are a number of ways that you can safeguard your health and physical safety when using hazardous materials. These measures include:

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training and communication</td>
<td>If you don’t know how to work with a chemical, ask! Make sure everyone in your work area knows the possible hazards.</td>
</tr>
<tr>
<td>Environmental monitoring</td>
<td>REM regularly monitors labs to insure exposure limits are not reached. You should notify REM of any materials used where they are likely to cause high exposure.</td>
</tr>
<tr>
<td>Personal monitoring</td>
<td>Be on the lookout for any physical symptoms which would indicate that you or your coworkers have been overexposed to any hazardous chemical. Symptoms, such as skin rashes, dizziness, eye or throat irritations or strong odors, should be reported to your supervisor.</td>
</tr>
</tbody>
</table>
SECTION 5

Additional Hazards in the PHYS Building
As an employee of the Department of Physics and Astronomy, you may occasionally have reasons to be in areas that have hazards beyond chemical exposure. The most frequent hazards to be aware of are:

- Lasers
- Radiation sources
- Cryogenic liquids
- Machine shops

The following section addresses what you need to know if you are a non-user in an area where these items are found. If you plan to use any of these in your regular duties, you will need to receive training from REM.
SAFETY IN LASER LABS

Areas with Class 3B or 4 lasers should have a sign or light on the door warning you that they are present and when they are in use.

• Direct exposure to a Class 3B lasers can result in eye damage.
• Exposure to direct beam or scattered light from a Class 4 laser can result in eye and skin damage.

Use caution when entering these areas and do so only when the laser users are aware of your presence. Laser light is not always visible when in use.

Do not touch any laser equipment unless you have been certified by REM.
Radiation use areas will be labeled on the door, work area, and storage area.

Use caution when entering these areas and do so only when the users are aware of your presence. As a “non-radiation” worker, your exposure limits are 2% of those of “radiation” workers.

Assume you do not know where radiation sources have been used within the lab.

Do not bring food or drink into radiation areas where a “No eating or drinking” sign is on the outside door. Ingestion of radioactive materials can result in damage at the cellular level.

Do not place personal items on work spaces where radioactive materials are used.

Wash your hands after leaving the area.
Many labs in PHYS use cryogenic liquids (having a temperature of −150 °C or lower.) The most commonly encountered cryogens in PHYS are liquid nitrogen, liquid oxygen, liquid argon, and liquid helium.

Cryogens can cause terrible "burns" (death of living tissue caused by the extreme cold) on skin and eyes.

Asphyxiation is a potential hazard in closed areas when nitrogen, argon, and helium are in use. You do not have any warning with these gases. You simply pass out.

Do not handle cryogenics unless you have been trained by the users of the laboratory you are visiting.
When entering the machine shops in the Physics Building it’s important that you follow the following procedures:

Wear safety glasses while in the shop

No loose clothing may be worn in the shop including ties, scarves and loose sleeves. Open-toed shoes, short pants, or skirts are also prohibited.

Do not operate any of the equipment

Do not startle or approach anyone operating equipment. If you must speak with them, wait until they complete their task.
You have now completed all of the training materials for HAZCOM safety in the department.

Please visit https://purdue.qualtrics.com/jfe/form/SV_1TWTZPO6ZhsMG2h to take the course test. You must pass the test at the 90% level.