

California Institute of Technology

Hazard Communication Program



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INTRODUCTION

The purpose of the Hazard Communication Program is to increase employee awareness regarding hazardous substances used in the workplace. This document outlines how this will be accomplished.

This written Hazard Communication Program is available upon request, to any employee, their designated representatives, and government regulators in accordance with CCR, Title 8, § 5194, Hazard Communication. This written program can be obtained or requested:

1. Online: <https://www.safety.caltech.edu/documents/93-hazcom.pdf>
2. In person by visiting the EH&S office in Keith Spalding B-125
3. By contacting the Safety Office by email: Safety@caltech.edu
4. By calling x6727 from a Caltech phone

Scope

The California Institute of Technology (Caltech, or the Institute) will provide and maintain this Program for all work areas where employees may be potentially exposed to hazardous substances.

This Program applies to all non-research Institute employees who work with hazardous materials. Such materials include, but are not limited to, chemicals, paints, inks, glues, cleaning agents, and compressed gases. Affected employees must be familiar with and adhere to the requirements of this document.

Exempt or Provisionally Exempt Operations and Substances

Certain operations and substances are exempt or provisionally exempt from the Hazard Communication Program.

1. Personnel working in research laboratories are exempt from the Hazard Communication Program and should refer to Caltech's online [Chemical Hygiene Plan](#).
2. Work operations where employees only handle chemicals in sealed containers that are not opened under normal conditions are partially exempt from the Hazard Communication Program. Such operations may include Institute stockrooms and shipping/receiving areas. The Hazard Communication Program applies to these operations in the following ways:
 - A) Labels on incoming containers of hazardous chemicals are not removed or defaced;
 - B) Ensure safety data sheets are accessible to employees by having hard copies or electronic access; and
 - C) Employees receive the EH&S Hazard Communication training and job-specific Hazard Communication training provided by their Supervisor.

3. The following substances are exempt from the requirements of this Hazard Communication Program:
 - A) Hazardous waste;
 - B) Tobacco and tobacco products;
 - C) Wood and wood products that the only hazard they pose to employees is the potential for flammability or combustion;
 - D) Manufactured items that are 1) formed in a specific shape or design during manufacture; 2) which have end use function(s) dependent upon their shape or design during end use; and 3) which does not release hazardous chemicals under normal conditions of use or in a reasonably foreseeable emergency;
 - E) Foods, drugs, and cosmetics intended for personal consumptions by employees;
 - F) Consumer products used in the workplace as a typical consumer would use them.

Responsibilities

Supervisors

Supervisors are responsible for implementing the Caltech Hazard Communication Program at the local operational level for the areas they supervise and to ensure all employees under their jurisdiction are compliant with the Program. Responsibilities include:

1. Identifying hazardous materials present in the work area;
2. Ensuring employees have access to current Safety Data Sheets (SDSs) for the hazardous materials in the workplace;
3. Ensuring employees have completed the EH&S Hazard Communication training;
4. Providing and documenting training on job-specific chemical hazards to which employees may have an exposure risk;
5. Maintaining a list of hazardous materials present in the areas under their jurisdiction, updated at least annually (see [Appendix D](#) for a Hazardous Materials List template);
6. Ensuring all containers are labeled; and
7. Immediately notifying Caltech EH&S of any new or significant chemical hazards in the workplace.

Employees

Employees are responsible for:

1. Adhering to the precautions outlined on container labels, SDSs, and established procedures;
2. Ensure all chemical containers under their control are labeled according to the requirements given in [Appendix A](#);
3. Completing Hazard Communication training, job-specific training, and requesting any additional training on hazards that they are unfamiliar with before beginning work;

4. Knowing the hazards and precautionary measures for working with hazardous materials in the work area; and
5. Using personal protective equipment as deemed necessary.

Environment, Health, and Safety (EH&S)

EH&S is responsible for:

1. Maintaining the written Hazard Communication Program;
2. Providing assistance to supervisors with identifying hazardous substances in the work area, evaluating potential hazards of operations, and training;
3. Providing Hazard Communication training to employees and maintaining training records; and
4. Maintaining exposure monitoring documentation per the [Institute Records Retention and Disposition Guidelines](#) (for the duration of employment plus 30 years).

Program Guidelines

This Hazard Communication Program includes guidelines for:

- Identification and maintaining a list hazardous materials in the workplace
- Container Labeling
- Safety Data Sheets (SDSs)
- Training
- Non-routine and routine tasks involving hazardous materials
- Unlabeled Pipe systems
- Emergency Response
- Informing non-Institute workers

Applicable Regulations

- [California Code of Regulations, Title 8, General Industry Safety Orders, § 5194](#)
- [Code of Federal Regulations, Chapter 29, § 1910.1200](#)

PROGRAM ELEMENTS

I. Identification of Hazardous Materials

Safety Data Sheets (SDSs), product labels, and various published regulatory and advisory agency lists should be utilized when assessing hazardous materials in the workplace. Additionally, any other substances determined by scientific evidence to present a hazard should also be considered hazardous. EH&S is available to assist with identifying hazardous materials.

The published regulatory and advisory lists of hazardous materials for reference include:

1. [Chemicals on the Director's List of Hazardous Substances, 8 CCR 339](#)
2. [Chemicals on the Toxic and Hazardous Substances List, 29 CFR 1910, Subpart Z](#)
3. [Chemicals containing Threshold Limit Values by the American Conference of Governmental Hygienists](#)
4. [Chemicals identified in the 14th Report on Carcinogens \(RoC\) by the National Toxicology Program](#)
5. [Chemicals identified by the International Agency for Research on Cancer \(IARC\)](#)
6. [Chemicals found listed on Proposition 65](#)
7. [Chemicals found to present a personal hazard as determined by scientific evidence](#)

Identification of hazardous materials in the workplace is needed in order to fulfill the requirement for maintaining a hazardous materials list. Supervisors are responsible for maintaining the hazardous materials list and it is to be updated at least annually using the template in [Appendix D](#), or the equivalent.

II. Container Labeling

All containers with hazardous materials must be labeled legibly and prominently, in English. Labels on incoming hazardous materials cannot be removed unless they are immediately replaced with a new label containing the appropriate information. Damaged labels must be replaced. Primary containers and secondary containers have specific labeling requirements. [Appendix A](#), *Container Labeling*, contains the components of the Institute's labeling system. Supervisors are responsible for ensuring the proper labeling of hazardous substances used in their work areas.

Employees are to contact their Supervisor or EH&S for assistance with identifying hazardous substances or interpreting terminology.

For the labeling of primary and secondary containers as outlined in [Appendix A](#), the Institute uses the hazard categories set forth in the Globally Harmonized System for Classification and Labeling of Chemicals (GHS). Many chemicals may fall into more than one chemical hazard category. Where a substance or mixture presents more than one GHS

hazard, there is a GHS precedence scheme for pictograms and signal words. GHS physical and health hazards are briefly described in [Appendix C](#).

III. Safety Data Sheets (SDS)

Previously known as Material Safety Data Sheets (MSDS), Safety Data Sheets (SDSs) are documents containing comprehensive information on substances and mixtures. The information provided in an SDS is summarized in [Appendix B](#).

Each employee must know how to access current SDSs for all substances used in their work area. SDSs can be maintained as hard copies or be available electronically as long as there are no barriers to immediate employee access. The EH&S web site <http://safety.caltech.edu> provides online resources for obtaining [SDSs](#).

SDSs are created by manufacturers, and should be shipped with all hazardous materials. In cases where a manufacturer did not provide an SDS with a substance, the individual purchasing or obtaining the material is responsible for submitting a written request for an SDS to the manufacturer within seven (7) days of noting this missing information. A copy of the obtained SDS should be provided to the Supervisor and maintained for future reference.

IV. Training

Institute employees working with or around hazardous substances have the right to know about the inherent hazards and safety requirements that should be followed. All Institute employees for whom this Program applies must receive appropriate information and training at the time of initial assignment and prior to working with these materials.

Caltech EH&S provides Hazard Communication training to employees that covers the general requirements of the Program. Job-specific training on the specific hazardous materials present at a workplace, and the necessary safety precautions, needs to be completed and documented by an employee's Supervisor.

Employees must receive supplemental training by supervisors when new hazards are introduced or discovered. Supervisors should train affected employees on hazardous substance information contained in SDSs. Caltech EH&S can assist with additional training on demand as needed.

V. Non Routine Tasks Involving Hazardous Materials

Institute employees periodically perform non-routine tasks involving hazardous materials. These events may include emergencies and non-routine servicing of equipment. Affected employees must receive information about the hazardous materials or unique job hazards prior to starting work on such projects. This information, provided by the employee's Supervisor, includes:

- Accessibility to SDS data;
- Specific hazards;
- Required protective/safety measures utilized, including the proper and safe processes and procedures for handling the material; and
- Measures the Institute has taken to reduce the hazards including ventilation, respiratory protection, PPE, the presence of another employee, and emergency procedures.

VI. Routine Tasks Involving Hazardous Materials

Tasks which involve routine handling of hazardous materials require both Hazard Communication training and job-specific training.

Routine tasks include: manually handling, transporting, opening, and/or closing containers which can contain hazardous materials (e.g. solvents, paints, used oil). Supervisors should provide the necessary guidance and procedures for employees to work safely when performing these tasks.

VII. Unlabeled Pipe Systems

Work with unlabeled pipes shall only occur by authorized employees who have been trained on the hazards present. Supervisors must inform the authorized employee(s) of the following *prior to beginning work*:

- Compounds in the pipes;
- Potential hazards; and
- Necessary safety precautions.

VIII. Emergency Response

All employees should be familiar with their emergency escape routes and procedures, and follow the guidance of Floor Wardens and Building Coordinators in the event a natural or man-made disaster occurs.

For direct or suspected chemical contact or exposure, consult the SDS for first aid procedures. General guidelines for chemical contact or exposure include:

- Remove contaminated clothing;
- Flush the affected area with water for at least 15 minutes;
- Remove employee to fresh air in the event of inhalation of hazardous materials;
- Contact employee's Supervisor/Manager immediately; and
- If injuries are beyond what is treatable by first-aid, seek professional medical attention as quickly as possible by contacting Caltech Security.

In an emergency, please dial extension 5000 or 626-395-5000.

If a chemical spill occurs, consult the SDS for guidance on how to respond to the spill. Only trained and knowledgeable personnel with access to the proper materials to clean a spill should do so.

Depending on the nature of the spill, such as the hazards, size of the spill and/or if an injury has occurred, it may be considered an emergency. In such a case, **dial extension 5000 or 626-395-5000.**

Additional information on emergency response procedures can be found in the [Emergency Response Guide](#) posted throughout the buildings on campus.

INFORMING NON-INSTITUTE WORKERS

Institute groups hiring non-Institute personnel or temporary service providers (consultants, contractors, visitors) to perform work at Caltech shall provide the following information to the employer prior to beginning work:

1. A list of hazardous chemicals found in that work area;
2. Precautionary measures required to protect the employees during normal operations;
3. A description of the Institute labeling system;
4. Access to SDSs for each hazardous substance the worker(s) may be exposed to while working; and
5. Emergency procedures.

Construction contractors will be provided the above information during the pre-construction meeting as outlined in the [Construction Safety Guide](#).

Visiting researchers should consult with Lab Managers/Principal Investigators that supervise their operations to receive training on laboratory guidelines. In addition, the requirements of the [Institute Chemical Hygiene Plan](#) must also be followed.

APPENDIX A: CONTAINER LABELING

Primary Containers

A primary container is the container received from the manufacturer or distributor. The Hazard Communication standard requires that labels on primary containers have the following information:

- Product identifier;
- Pictogram(s) that convey specific information about the hazards of the chemical
- Signal words: a single word used to indicate the relative level of severity of the hazard that alerts the reader to a potential hazard on the label. The signal words used can either be “danger” or “warning”. “Danger” is used for the more severe hazards, while “warning” is used for less severe hazards;
- Hazard statement: a statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard;
- Precautionary Statement: a phrase that describes recommended measures to be taken to minimize or prevent adverse effects resulting from exposures to a hazardous chemical or improper storage or handling of a hazardous chemical; and
- Name, address, and phone number of the manufacturer.

Sample Primary Label

The label below is an example of an appropriate label for a primary container.

The diagram shows a sample GHS-compliant label for Ammonia. The label is rectangular with a white background and a black border. At the top, it says "Components Of A GHS-Compliant Label". The label content is as follows:

- product identifier:** AMMONIA
- signal word:** DANGER
- hazard statement:** TOXIC IF INGESTED
- precautionary statements:** Wash hands thoroughly after handling. Keep container tightly closed when not in use. Keep away from heat, sparks and open flames - may explode when exposed to high heat. Use in an open area that is well-ventilated. Breathing in ammonia is irritating and corrosive. Wear protective gloves and safety goggles to prevent burns and irritation. If swallowed: Immediately call Poison Control or doctor/physician. Drink water or milk to dilute ammonia.
- supplier information:** ABC Chemicals - 123 Main Street - Cincinnati, OH - www.abcchem.com - 800-733-5252

On the right side of the label, there are three pictograms in red diamond shapes: a flame (F+), a skull and crossbones (T+), and a hand being poured on (C+). A yellow callout box labeled "pictograms" points to these symbols. At the bottom right, there is a note: "See Safety Data Sheet (SDS) for further details regarding safe use of this product."

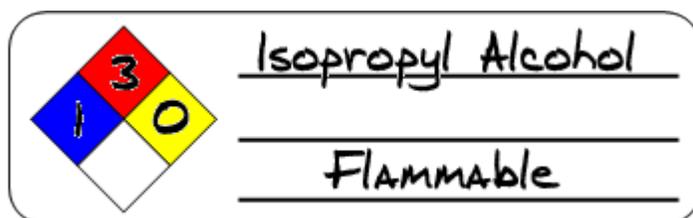
Source: [General Label Company, Inc.](http://www.general-label.com)

Secondary Containers

A secondary container is the container in which the product is dispensed for use. To further ensure employees are aware of the hazards of materials used in their work areas, Caltech labels all secondary containers. Examples of secondary containers include squeeze bottles and chemical baths. Secondary containers should be labeled with, at minimum, the following:

- Identity of the hazardous substance; and
- Appropriate hazard warning(s) (i.e., flammable, corrosive, etc.)

The following is an example of a secondary label for Isopropyl Alcohol, which also includes the NFPA diamond rating for this chemical (optional and preferred).



Exception Containers

Portable containers do not require labels when:

1. Hazardous materials are transferred from like labeled containers;
2. The transferred hazardous material is under the control and used only by the person who transferred it; and
3. The containers are intended for use within the work shift in which the transfer occurred.

Important Note: Employees who use exception containers are required to follow Institute policies and procedures for the proper disposal of the hazardous materials immediately after they have completed the task requiring the use of the material.

APPENDIX B: SAFETY DATA SHEETS (SDS)

General Information

The Safety Data Sheet, SDS, must include, at a minimum, the information in the described sections below and in the order listed. Although the style and layout may vary by manufacturer or distributor, every section must be complete, even if the item is not applicable (indicated by N/A).

The SDS is prepared by the manufacturer or importer of the product. Other sources of data on toxic and health effects can be consulted for more complete information. You may contact the manufacturer or EH&S if additional information or clarification is needed.

Section 1: Identification of the Substance or Mixture and of the Supplier

- GHS product identifier
- Other means of identification
- Recommended use of the chemical and restrictions on use
- Supplier's details (including name, address, phone number, etc.)
- Emergency phone number

Section 2: Hazards Identification

- GHS classification of the substance/mixture and any national or regional information.
- GHS label elements, including precautionary statements (Hazard symbols may be provided as a graphical reproduction of the symbols in black and white or the name of the symbol, e.g., flame, skull and crossbones.)
- Other hazards which do not result in classification (e.g., dust explosion hazard) or are not covered by the GHS.

Section 3: Composition/Information on Ingredients

- Substance
- Chemical identity
- Common name, synonyms, etc.
- CAS number, EC number, etc.
- Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance.
- The chemical identity and concentration or concentration ranges of all ingredients which are hazardous within the meaning of the GHS and are present above their cutoff levels.

Section 4: First Aid Measures

- Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact, and ingestion
- Most important symptoms/effects, acute and delayed

- Indication of immediate medical attention and special treatment needed, if necessary

Section 5: Firefighting Measures

- Suitable (and unsuitable) extinguishing media
- Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products)
- Special protective equipment and precautions for firefighters

Section 6: Accidental Release Measures

- Personal precautions, protective equipment and emergency procedures
- Environmental precaution
- Methods and materials for containment and clean-up

Section 7: Handling and Storage

- Precautions for safe handling
- Conditions for safe storage, including any incompatibilities

Section 8: Exposure Controls/Personal Protection

- Control parameters, e.g., occupational exposure limit values or biological limit values
- Appropriate engineering controls
- Individual protection measures, such as personal protective equipment

Section 9: Physical and Chemical Properties

- Appearance (physical state, color, etc.)
- Odor
- Odor threshold
- pH
- Melting point/freezing point
- Initial boiling point and boiling range
- Flash point
- Evaporation rate
- Flammability (solid, gas)
- Upper/lower flammability or explosive limits
- Vapor pressure
- Vapor density
- Relative density
- Solubility(ies)
- Partition coefficient: n-octanol / water
- Auto ignition temperature
- Decomposition temperature

Section 10: Stability and Reactivity

- Chemical stability
- Possibility of hazardous reactions
- Conditions to avoid (e.g., static discharge, shock or vibration)
- Incompatible materials
- Hazardous decomposition products

Section 11: Toxicological Information

- Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact)
- Symptoms related to the physical, chemical and toxicological characteristics
- Acute and chronic effects from short- and long-term exposure
- Numerical measures of toxicity (such as acute toxicity estimates)

Section 12: Ecological Information

- Ecotoxicity (aquatic and terrestrial, where available)
- Persistence and degradability
- Bioaccumulative potential
- Mobility in soil.
- Other adverse effects

Section 13: Disposal Considerations

- Waste Residues
- Safe Handling
- Methods of disposal

Section 14: Transport Information

- UN Number
- UN Proper shipping name
- Transport Hazard class(es)
- Packing group, if applicable
- Marine pollutant (Yes/No)

Section 15: Regulatory Information

- Safety, health and environmental regulations specific for the product in question.

Section 16: Other

- Other information including information on preparation and revision of the SDS

Availability of SDS

Department Supervisors are responsible for ensuring Safety Data Sheets (SDSs) are maintained and readily accessible for all hazardous substances that employees use.

Most hazardous substances have SDSs readily available via the internet. SDSs available via the internet do not need to be kept in hard copy format. Caltech EH&S provides online resources for obtaining SDS on their website at <http://safety.caltech.edu>, or alternatively, Institute employees may contact the Caltech EH&S office for further assistance by calling extension 6727 or (626) 395-6727.

APPENDIX C: GHS PICTOGRAMS GUIDE

<p>Health Hazard</p>  <ul style="list-style-type: none"> ▪ Carcinogen ▪ Mutagenicity ▪ Reproductive Toxicity ▪ Respiratory Sensitizer ▪ Target Organ Toxicity ▪ Aspiration Toxicity 	<p>Flame</p>  <ul style="list-style-type: none"> ▪ Flammables ▪ Pyrophorics ▪ Self-Heating ▪ Emits Flammable Gas ▪ Self-Reactives ▪ Organic Peroxides 	<p>Exclamation Mark</p>  <ul style="list-style-type: none"> ▪ Irritant (skin and eye) ▪ Skin Sensitizer ▪ Acute Toxicity (harmful) ▪ Narcotic Effects ▪ Respiratory Tract Irritant ▪ Hazardous to Ozone Layer (Non-Mandatory)
<p>Gas Cylinder</p>  <ul style="list-style-type: none"> ▪ Gases Under Pressure 	<p>Corrosion</p>  <ul style="list-style-type: none"> ▪ Skin Corrosion/Burn ▪ Eye Damage ▪ Corrosive to Metals 	<p>Exploding Bomb</p>  <ul style="list-style-type: none"> ▪ Explosives ▪ Self-Reactives ▪ Organic Peroxides
<p>Flame Over Circle</p>  <ul style="list-style-type: none"> ▪ Oxidizers 	<p>Environment (Non-Mandatory)</p>  <ul style="list-style-type: none"> ▪ Aquatic Toxicity 	<p>Skull and Crossbones</p>  <ul style="list-style-type: none"> ▪ Acute Toxicity (fatal or severe)

