

# Introduction to Hazard Communication



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# OSHAcademy Course 105 Study Guide

## Introduction to Hazard Communication

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Contact OSHAcademy to arrange for use as a training document.

This study guide is designed to be reviewed off-line as a tool for preparation to successfully complete OSHAcademy Course 105.

Read each module, answer the quiz questions, and submit the quiz questions online through the course webpage. You can print the post-quiz response screen which will contain the correct answers to the questions.

The final exam will consist of questions developed from the course content and module quizzes.

We hope you enjoy the course and if you have any questions, feel free to email or call:

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## Contents

Modules and Learning Objectives .....	1
Module 1 - Controls and Labeling.....	1
Module 2 - Safety Data Sheets (SDS) .....	1
Module 1: Controls and Labeling.....	2
Introduction .....	2
OSHA's Top 10.....	2
The Hazard Communication Standard.....	3
The GHS Process .....	3
Global Harmonization System (GHS) .....	4
Hazardous Substances and Chemicals.....	5
Forms of Hazardous Chemicals.....	6
Chemical Effects.....	7
Routes of Entry.....	7
Chemical Hazard Control Strategies .....	8
Types of Containers and Labels .....	9
Shipped - Primary Container Label Requirements .....	10
Workplace or Secondary Container Labeling .....	11
Portable Container Labeling .....	12
Labeling Solid Materials.....	13
HCS 2012 Pictogram Requirements.....	13
HCS Pictograms and Hazards .....	14
Module 2: Safety Data Sheets.....	16
The SDS Form .....	16

SDS Management.....	21
Employer Responsibilities .....	22
Training Requirements.....	23
Training Topics .....	24
Training at Multi-Employer Worksites.....	25
Training Temporary Employees .....	25
Training for Emergencies .....	26

## Modules and Learning Objectives

### Module 1 - Controls and Labeling

Learning objectives in this module include:

- Describe the basic sections of the HCS 2012 standard.
- Describe benefits of the Global Harmonized System of Classification and Labeling of Chemicals (GHS).
- Define "hazardous substances" and give examples of physical and health hazards.
- Describe the chemical effects and four primary routes of entry when employees are exposed.
- Discuss the "Hierarchy of Controls" for controlling chemical hazards.
- List the types of chemical containers and the labeling requirements for each type.
- Describe the nine HCS pictograms and the hazards they represent.

### Module 2 - Safety Data Sheets (SDS)

Learning objectives in this module include:

- Discuss the purpose of the safety data sheet (SDS).
- Describe the SDS requirements for manufacturers, distributors, importers and employers.
- List and describe each of the required 16 sections of the SDS.
- Discuss employee training requirements for the HCS 2012 program.
- Discuss HCS 2012 requirements on multi-employer worksites.

## Module 1: Controls and Labeling

### Introduction

More than 30 million workers are potentially exposed to one or more chemical hazards in the workplace. There are an estimated 650,000 existing hazardous chemical products and hundreds of new ones are being introduced annually. This poses a serious challenge for employers as well as a health and safety hazard for exposed employees.

Because of the seriousness of these safety and health problems, and because many employers and employees know little or nothing about them, OSHA issued the original Hazard Communication Standard (HCS) in 1994. The basic goal of the standard is to be sure employers and employees know about work hazards and how to protect themselves; this should help to reduce the incidence of chemical source illness and injuries. As you can see below, Hazard Communication is close to the top of OSHA's Top 10 Cited Standards and is consistently at or near the top each year.

### OSHA's Top 10

The following were the top 10 most frequently cited standards by Federal OSHA in fiscal year 2016:

- Fall protection
- **Hazard communication**
- Scaffolding
- Respiratory protection
- Control of hazardous energy (lockout/tagout)
- Powered industrial trucks
- Ladders, construction
- Machine guarding (machines, general requirements, general industry)
- Electrical, wiring methods, components and equipment
- Electrical systems design, general requirements

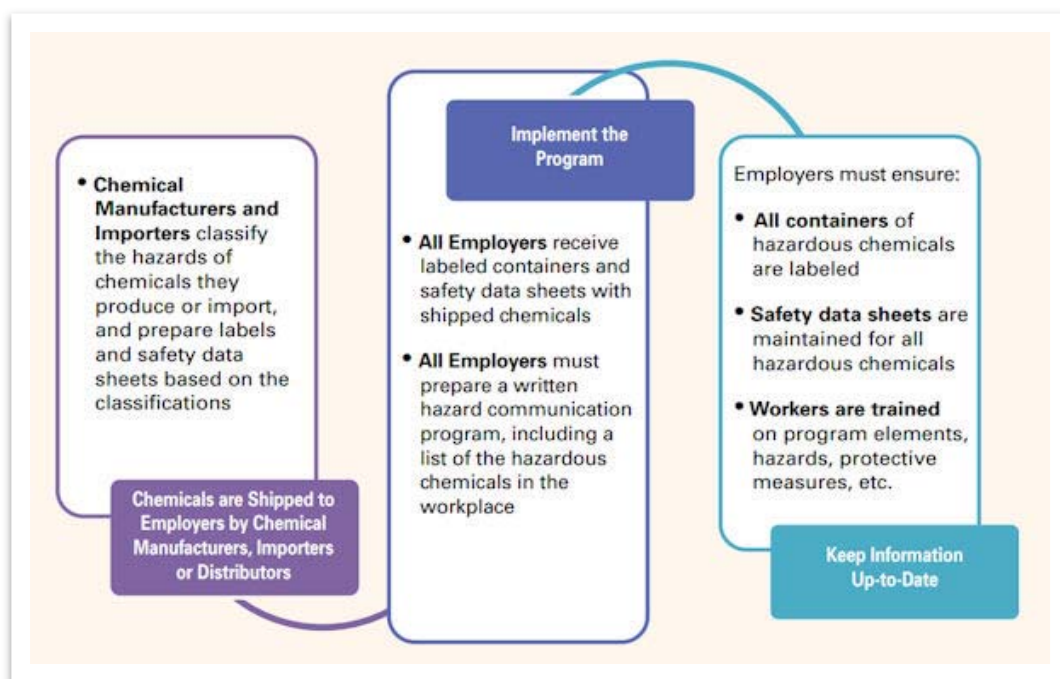
In March 2012, the Occupational Safety and Health Administration (OSHA) revised its Hazard Communication Standard to align it with the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS)



This course will discuss OSHA's 2012 Hazard Communication Standard and how employees can protect themselves from the dangers of hazardous chemicals in their work environment.

## The Hazard Communication Standard

If you're exposed to hazardous chemicals at work, OSHA's Hazard Communication Standard (29 CFR 1910.1200) will help you identify the hazards of those materials and how to use them safely. Your employer must also teach you about the protective measures when working with hazardous chemicals. When you have this important information, you will be able to take steps to protect yourself from the negative effects caused by accidental exposure.



## The GHS Process

OSHA's Hazard Communication Standard (HCS) requires employers and manufacturers to develop and distribute chemical information as described below:

- Chemical manufacturers and importers must classify the hazards of the chemicals they produce or import, and prepare labels and safety data sheets to convey the hazard information to their downstream customers.
- Employers with classified hazardous chemicals in their workplaces must have labels and safety data sheets for their exposed workers, and train workers to safely handle those chemicals.

As mentioned above, the standard requires your employer to provide information to employees about the hazardous chemicals to which they are exposed, by means of:

1. A hazard communication program,
2. labels and other forms of warning,
3. safety data sheets, and
4. information and training.

Employers who do not produce or import chemicals need only focus on those parts of this rule that deal with establishing a workplace program and communicating information to their workers.

### Quiz Instructions

After each section, there is a quiz question. Make sure to read the material in each section to discover the correct answer to these questions. Circle the correct answer. When you are finished go online to take the final exam. This exam is open book, so you can use this study guide.

**1. Employers must provide information to employees about the hazardous chemicals to which they are exposed, by each of the following means, EXCEPT \_\_\_\_\_.**

- a. information and training
- b. labels and other forms of warning
- c. walkaround inspections
- d. safety data sheets

### Global Harmonization System (GHS)

The new HCS 2012 is now aligned with the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS) that provides many benefits, including:

- Providing a common and coherent approach to classifying chemicals and communicating hazard information on labels and safety data sheets;
- Improving the quality and consistency of hazard information in the workplace;
- Helping reduce trade barriers;

- Productivity improvements for American businesses that regularly handle, store, and use classified hazardous chemicals;
- Providing cost savings for American businesses that periodically update safety data sheets and labels for classified chemicals.

Historical note: The old HCS 1994 gave workers the right to know, but the new HCS 2012 gives workers the right to understand: this is a very important change in OSHA's approach.

**2. The HCS 2012 provides a common and coherent approach to \_\_\_\_\_ chemicals and communicating hazard information.**

- a. classifying
- b. distributing
- c. manufacturing
- d. importing

### **Hazardous Substances and Chemicals**

OSHA has defined the term "substances" as chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

For the purposes of the HCS, a hazardous chemical means any chemical which is classified as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified.

**Physical hazards** - a chemical that is classified as posing one of the following hazardous effects:

- explosive
- flammable (gases, aerosols, liquids, or solids)
- oxidizer (liquid, solid or gas)
- self-reactive; pyrophoric (liquid or solid)
- self-heating
- organic peroxide
- corrosive to metal

- gas under pressure
- or in contact with water emits flammable gas

See Appendix B to 1910.1200 -- Physical Hazard Criteria.

**Health hazard** - means a chemical which is classified as posing one of the following hazardous effects:

- acute toxicity (any route of exposure)
- skin corrosion or irritation
- serious eye damage or eye irritation
- respiratory or skin sensitization
- germ cell mutagenicity
- carcinogenicity
- reproductive toxicity
- specific target organ toxicity (single or repeated exposure) or
- aspiration hazard

The criteria for determining whether a chemical is classified as a health hazard are detailed in 1910.1200, Appendix A - Health Hazard Criteria.

**3. Under the HCS 2012, which of the following is an example of a physical hazard?**

- a. Reproductive toxicity
- b. Skin irritant
- c. Corrosive to metal
- d. Carcinogen

### Forms of Hazardous Chemicals

You might think that the chemicals which apply to the rule are those in liquid, gas or particulate form. But, the standard's definition of "chemical" is much broader than that commonly used. According to the HCS, chemicals that apply may exist in one of many forms:

- **Dusts** - are finely divided particles. Example - wood dust.

- **Fumes** - are even smaller particles usually formed when solid metal is heated and vaporized, and then condenses as tiny particles.
- **Fibers** - are similar to dusts but are of an elongated shape. Examples - asbestos and fiberglass.
- **Mists** - are liquid droplets that have been sprayed into the atmosphere.
- **Vapors** - are gases formed when liquid evaporates.
- **Gases** - are substances that are normally airborne at room temperature. A vapor is the gaseous phase of a substance which is normally a liquid or solid at room temperature.
- **Solids** - such as metal, treated wood, plastic.
- **Liquids** - the most common form in the workplace.

**4. Which of the following are small particles, usually formed when solid metal is heated and vaporized and then condenses as tiny particles?**

- a. Mists
- b. Vapors
- c. Gases
- d. Fumes

### Chemical Effects

The effects chemicals have on the various organs of the human body depend on several important factors:

1. **The form of the chemical:** Is the chemical a solid, liquid, or gas?
2. **The route of entry:** How does the chemical contact the body? Is it ingested, inhaled, absorbed or injected?
3. **The dose:** How much chemical makes its way into the body?
4. **The toxicity:** How poisonous is the chemical?

### Routes of Entry

Another important task when assessing the workplace for chemical hazards is to determine the route(s) of entry the chemicals may take. If we know the route(s) of entry, we can then

determine appropriate engineering, administrative, and PPE controls to eliminate or reduce the exposure. The four common routes of entry are:

1. **Ingestion:** Do we eat or drink it?
2. **Inhalation:** Do we breathe it in? This is the most common route of entry.
3. **Absorption:** Does it pass through the skin, eyes or other membranes?
4. **Injection:** Does it enter through a puncture or cut?

**5. What is the most common route of entry for hazardous substances?**

- a. Ingestion
- b. Inhalation
- c. Absorption
- d. Injection

### Chemical Hazard Control Strategies

Hazardous substances can be used safely in workplaces if adequate control strategies are used to prevent exposure to those chemicals. To eliminate or reduce exposure to hazardous chemicals, an effective protocol called the "Hierarchy of Controls" has been developed. When you determine during a workplace assessment that exposure to harmful levels of hazardous chemicals is present, try to eliminate or reduce that exposure using the following strategies in the following order:

The first three strategies focus on doing something with the hazard.

1. **Elimination:** The best solution is to eliminate hazardous substances in the workplace.
2. **Substitution:** Substitution is the next-best solution. Replace a toxic substance with a less-toxic substance. If you can't get rid of the toxic substances, you may be able to replace them with substances that are at least less toxic.
3. **Engineering Controls:** Redesign or modify processes that use toxic chemicals to eliminate or reduce exposure to the chemical hazard itself.

The last two strategies focus on doing something with behaviors to reduce exposure to the hazard.

4. **Administrative Controls:** Change work procedures to reduce the duration, frequency, and severity of exposure to the chemical hazard. The chemical hazard, itself, is not eliminated or reduced using this strategy. The primary focus is to incorporate safer work practices through written safety policies, rules, supervision and training. And that is a problem because you may have to regularly supervise employees as they perform a task. These controls work only so long as employees act properly.
5. **Personal Protective Equipment (PPE):** The use of PPE is probably the most common strategy, and mandatory when working with hazardous chemicals. PPE forms a barrier between worker and hazard. Once again, the chemical hazard is neither eliminated nor reduced, and a high reliance is placed on appropriate use of PPE for this strategy to be successful.

Remember, the first question you want to ask is, "How can I eliminate, reduce, or engineer out the hazard?" Hopefully you will be able to eliminate the hazard or reduce it to the point where safe behaviors or PPE won't be necessary.

**6. Under the Hierarchy of Controls, elimination, substitution, and engineering controls are given higher priority because \_\_\_\_.**

- a. they are most effective in manipulating behaviors
- b. they focus on the greatest number of causes for accidents
- c. they are used when behaviors can't be effectively controlled
- d. they focus on doing something with the hazard

### Types of Containers and Labels

Container labeling can be a very effective method to communicate the physical and health hazards of chemicals used in the workplace. The information on a container label will vary depending on what type of container it is and how it is used. We will discuss labeling requirements under the HCS 2012 labeling requirements in this module.

We will look at the labeling requirements for each of the four types of containers listed below:

- shipped/primary containers
- workplace/secondary containers
- stationary containers
- portable containers

To learn more about the four types of container labels and associated requirements, download the [OSHA Brief, Hazard Communication Standard: Labels and Pictograms](#).

**7. All the following are types of containers described within the HCS 2012, EXCEPT \_\_\_\_\_.**

- a. inflatable containers
- b. workplace/secondary containers
- c. shipped/primary containers
- d. portable containers



### **Shipped - Primary Container Label Requirements**

Under the new HCS 2012, labels on containers shipped from manufacturers or distributors must be labeled, tagged or marked with the following six items:

1. **Product Identifier** – This should include the chemical identity of the substance.
2. **Signal Word** - Signal words used in GHS are "Danger" and "Warning." Danger is for the more severe hazard categories.
3. **Hazard Statements** - This is a phrase assigned to a hazard class and category that describes the nature of the hazards of a hazardous product, and the degree of the hazard.
4. **Pictograms** - These include symbols plus other elements, such as a border, background pattern or color that conveys specific information.
5. **Precautionary Statements** - These are phrases (and/or pictograms) that describe the recommended measures to minimize or prevent adverse effects resulting from exposure to a hazardous product.
6. **Supplier Identification** – Includes the name, address and telephone number of the manufacturer or supplier of the substance or mixture.



**SAMPLE LABEL**

<p><b>CODE</b> _____</p> <p><b>Product Name</b> _____</p>	} <b>Product Identifier</b>	<p style="text-align: center;"><b>Hazard Pictograms</b></p> <div style="display: flex; justify-content: space-around;">   </div>
<p><b>Company Name</b> _____</p> <p>Street Address _____</p> <p>City _____ State _____</p> <p>Postal Code _____ Country _____</p> <p>Emergency Phone Number _____</p>	} <b>Supplier Identification</b>	<p style="text-align: center;"><b>Signal Word</b></p> <p style="text-align: center;"><b>Danger</b></p>
<p>Keep container tightly closed. Store in a cool, well-ventilated place that is locked.</p> <p>Keep away from heat/sparks/open flame. No smoking.</p> <p>Only use non-sparking tools.</p> <p>Use explosion-proof electrical equipment.</p> <p>Take precautionary measures against static discharge.</p> <p>Ground and bond container and receiving equipment.</p> <p>Do not breathe vapors.</p> <p>Wear protective gloves.</p> <p>Do not eat, drink or smoke when using this product.</p> <p>Wash hands thoroughly after handling.</p> <p>Dispose of in accordance with local, regional, national, international regulations as specified.</p>		} <b>Hazard Statements</b>
<p><b>In Case of Fire:</b> use dry chemical (BC) or Carbon Dioxide (CO<sub>2</sub>) fire extinguisher to extinguish.</p> <p><b>First Aid</b></p> <p>If exposed call Poison Center.</p> <p>If on skin (or hair): Take off immediately any contaminated clothing. Rinse skin with water.</p>		} <b>Precautionary Statements</b>
		<p style="text-align: center;"><b>Supplemental Information</b></p> <p><b>Directions for Use</b></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Fill weight: _____ Lot Number: _____</p> <p>Gross weight: _____ Fill Date: _____</p> <p>Expiration Date: _____</p>

### Workplace or Secondary Container Labeling

Most employers use the primary containers they purchase to store and use chemicals. However, they may also use their own containers such as coffee cans, drums, plastic jugs, spray bottles, etc. to store and use smaller quantities of chemicals they purchase. These are called workplace or secondary containers.

Make sure your secondary containers are properly labeled, not only to protect employees, but to avoid OSHA citations. One of the most frequent citations related to HCS 2012 is "improperly labeled secondary containers." OSHA sees this frequently, and whatever OSHA sees the most, they cite the most: Remember that.

The employer must ensure that each workplace or secondary container of hazardous chemicals in the workplace is labeled, tagged or marked with either:

- The information required on shipped container labels; or,
- Product identifier and words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and specific information regarding the physical and health hazards of the hazardous chemical.



**8. What is the most common OSHA citation related to the HCS 2012 standard?**

- a. Lack of proper SDS documentation
- b. Use of primary containers in the workplace
- c. Improperly labeled secondary containers
- d. Insufficient personal protective equipment

**Portable Container Labeling**

It is important to know that portable containers must be under the positive control of the employee using it. If the employee walks away from the container and loses control of the chemical, it must be labeled as a workplace/secondary container.

Portable containers are used to transfer hazardous chemicals from labeled containers, and are intended only for the immediate use of the employee who performs the transfer. The employer is not required to label portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer.

Drugs which are dispensed by a pharmacy to a health care provider for direct administration to a patient are exempted from labeling.

## Labeling Solid Materials

For solid metal (such as a steel beam or a metal casting), solid wood, or plastic items that are not exempted as articles due to their downstream use, or shipments of whole grain, the required label may be transmitted to the customer at the time of the initial shipment, and need not be included with subsequent shipments to the same employer unless the information on the label changes.

For example, treated lumber is covered since the lumber is not completely cured at the time of shipment and the hazardous chemical will, to a varying degree, offgas during shipment and be available for exposure to employees. Railroad ties treated with creosote should have an accompanying safety data sheet (SDS) when shipped.

### **9. Why would treated lumber be required to have a shipped/primary label with initial shipment?**

- a. Employees could be exposed to chemical offgas
- b. Because all solid material must be labeled
- c. The lumber is not considered to be a solid
- d. Since the lumber might burn, it needs a label

## HCS 2012 Pictogram Requirements

The HCS 2012 requires GHS pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification.

## HCS Pictograms and Hazards

<i>HCS Pictograms and Hazards</i>		
<p style="text-align: center;"><b>Health Hazard</b></p> <div style="text-align: center;"></div> <ul style="list-style-type: none"> <li>• Carcinogen</li> <li>• Mutagenicity</li> <li>• Reproductive Toxicity</li> <li>• Respiratory Sensitizer</li> <li>• Target Organ Toxicity</li> <li>• Aspiration Toxicity</li> </ul>	<p style="text-align: center;"><b>Flame</b></p> <div style="text-align: center;"></div> <ul style="list-style-type: none"> <li>• Flammables</li> <li>• Pyrophorics</li> <li>• Self-Heating</li> <li>• Emits Flammable Gas</li> <li>• Self-Reactive</li> <li>• Organic Peroxides</li> </ul>	<p style="text-align: center;"><b>Exclamation Mark</b></p> <div style="text-align: center;"></div> <ul style="list-style-type: none"> <li>• Irritant (skin and eye)</li> <li>• Skin Sensitizer</li> <li>• Acute Toxicity</li> <li>• Narcotic Effects</li> <li>• Respiratory Tract Irritant</li> <li>• Hazardous to Ozone Layer (Non-Mandatory)</li> </ul>
<p style="text-align: center;"><b>Gas Cylinder</b></p> <div style="text-align: center;"></div> <ul style="list-style-type: none"> <li>• Gases Under Pressure</li> </ul>	<p style="text-align: center;"><b>Corrosion</b></p> <div style="text-align: center;"></div> <ul style="list-style-type: none"> <li>• Skin Corrosion/Burns</li> <li>• Eye Damage</li> <li>• Corrosive to Metals</li> </ul>	<p style="text-align: center;"><b>Exploding Bomb</b></p> <div style="text-align: center;"></div> <ul style="list-style-type: none"> <li>• Explosives</li> <li>• Self-Reactive</li> <li>• Organic Peroxides</li> </ul>
<p style="text-align: center;"><b>Flame Over Circle</b></p> <div style="text-align: center;"></div> <ul style="list-style-type: none"> <li>• Oxidizers</li> </ul>	<p style="text-align: center;"><b>Environment (Non-Mandatory)</b></p> <div style="text-align: center;"></div> <ul style="list-style-type: none"> <li>• Aquatic Toxicity</li> </ul>	<p style="text-align: center;"><b>Skull and Crossbones</b></p> <div style="text-align: center;"></div> <ul style="list-style-type: none"> <li>• Acute Toxicity (fatal or toxic)</li> </ul>

**10. If you saw a container with a pictogram with a skull and crossbones, what would it mean to you?**

- a. Target organ toxicity
- b. Acute toxicity (fatal or toxic)
- c. Carcinogenic
- d. Toxic narcotic effects

## Module 2: Safety Data Sheets

The HCS 2012 requires chemical manufacturers, distributors, or importers to provide Safety Data Sheets (SDSs) (formerly MSDSs or Material Safety Data Sheets) for each hazardous chemical to downstream users to communicate information on these hazards.

The SDS includes information such as:

- the properties of each chemical;
- the physical, health, and environmental health hazards;
- protective measures; and
- safety precautions for handling, storing, and transporting the chemical.

The information contained in the SDS must be in English (although it may be in other languages as well). OSHA requires that SDS preparers provide specific minimum information as detailed in [Appendix D of 29 CFR 1910.1200](#). The SDS preparers may also include additional information in various section(s). Employers must ensure that SDSs are readily accessible to employees.

**1. The Safety Data Sheet (SDS) describes all the following, EXCEPT \_\_\_\_\_.**

- a. the properties of each chemical
- b. the physical, health, and environmental health hazards
- c. reporting instructions for non-compliance
- d. the union representing the employee

### The SDS Form

The HCS 2012 requires new SDSs to be in a consistent user-friendly, 16-section format. The SDSs must include the section numbers, the headings, and associated information under the headings below:

**Section 1: Identification** - This section identifies the chemical on the SDS as well as the recommended uses. It also provides the essential contact information of the supplier. The required information consists of:

- Product identifier used on the label and any other common names or synonyms by which the substance is known.
- Name, address, phone number of the manufacturer, importer, or other responsible party, and emergency phone number.

- Recommended use of the chemical (e.g., a brief description of what it does, such as flame retardant) and any restrictions on use (including recommendations given by the supplier).

**Section 2: Hazard(s) Identification** - This section identifies the hazards of the chemical presented on the SDS and the appropriate warning information associated with those hazards. The required information consists of:

- The hazard classification of the chemical (e.g., flammable liquid, category 1).
- Signal word, pictograms.
- Hazard statement(s), precautionary statement(s).
- Description of any hazards not otherwise classified.

**Section 3: Composition/Information on Ingredients** - This section identifies the ingredient(s) contained in the product indicated on the SDS, including impurities and stabilizing additives. This section includes information on substances, mixtures, and all chemicals where a trade secret is claimed. The required information consists of:

- Substances - Chemical name; Common name and synonyms; Chemical Abstracts Service (CAS) number and other unique identifiers; Impurities and stabilizing additives, which are themselves classified and which contribute to the classification of the chemical.
- Mixtures - Same information required for substances; chemical name and concentration (i.e., exact percentage) of all ingredients which are classified as health hazards and are present above their cut-off/concentration limits or a health risk below the cut-off/concentration limits. The concentration (exact percentages) of each ingredient.
- Chemicals where a trade secret is claimed - A statement that the specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret is required.

**Section 4: First-Aid Measures** - This section describes the initial care that should be given by untrained responders to an individual who has been exposed to the chemical. The required information consists of:

- Necessary first-aid instructions by relevant routes of exposure (inhalation, skin and eye contact, and ingestion).
- Description of the most important symptoms or effects, and any symptoms that are acute or delayed.

- Recommendations for immediate medical care and special treatment needed, when necessary.

**2. Which SDS section would display signal words and pictograms?**

- a. Section 1: Identification
- b. Section 2: Hazard(s) Identification
- c. Section 3: Composition/Information on Ingredients
- d. Section 4: First-Aid Measures

**Section 5: Fire-Fighting Measures** - This section provides recommendations for fighting a fire caused by the chemical. The required information consists of:

- Recommendations of suitable extinguishing equipment, and information about extinguishing equipment that is not appropriate for a situation.
- Advice on specific hazards that develop from the chemical during the fire, such as any hazardous combustion products created when the chemical burns.
- Recommendations on special protective equipment or precautions for firefighters.

**Section 6: Accidental Release Measures** - This section provides recommendations on the appropriate response to spills, leaks, or releases, including containment and cleanup practices to prevent or minimize exposure to people, properties, or the environment. The required information may consist of recommendations for:

- Use of personal precautions and protective equipment to prevent the contamination of skin, eyes, and clothing.
- Emergency procedures, including instructions for evacuations, consulting experts when needed, and appropriate protective clothing.
- Methods and materials used for containment.
- Cleanup procedures.

**Section 7: Handling and Storage** - This section provides guidance on the safe handling practices and conditions for safe storage of chemicals. The required information consists of:

- Precautions for safe handling, including recommendations for handling incompatible chemicals, minimizing the release of the chemical into the environment, and providing advice on general hygiene practices.



- Recommendations on the conditions for safe storage, including any incompatibilities. Provide advice on specific storage requirements (e.g., ventilation requirements).

**Section 8: Exposure Controls/Personal Protection** - This section indicates the exposure limits, engineering controls, and personal protective measures that can be used to minimize worker exposure. The required information consists of:

- OSHA Permissible Exposure Limits (PELs), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), and any other exposure limits.
- Appropriate engineering controls.
- Recommendations for measures to prevent illness or injury from exposure to chemicals, such as personal protective equipment (PPE).
- Any special requirements for PPE, protective clothing or respirators.

**3. Which SDS section includes containment and cleanup practices to prevent or minimize exposure to people, properties, or the environment?**

- a. Section 5: Fire-Fighting Measures
- b. Section 6: Accidental Release Measures
- c. Section 7: Handling and Storage
- d. Section 8: Exposure Controls/Personal Protection

**Section 9: Physical and Chemical Properties** - This section identifies physical and chemical properties associated with the substance or mixture. The minimum required information consists of:

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

**Section 10: Stability and Reactivity** - This section describes the reactivity hazards of the chemical and the chemical stability information. This section is broken into three parts: reactivity, chemical stability, and other. The required information consists of:

- **Reactivity** - Description of the specific test data for the chemical(s).
- **Chemical stability** - Indication of whether the chemical is stable or unstable under normal temperature and conditions. Description of any stabilizers. Indication of any safety issues should the product change in physical appearance.
- **Other** - Indication of the possibility of hazardous reactions and conditions under which hazardous reactions may occur. List of all conditions that should be avoided. List of all classes of incompatible materials. List of any known or anticipated hazardous decomposition products.

**Section 11: Toxicological Information** - This section identifies toxicological and health effects information or indicates that such data are not available. The required information consists of:

- Information on the likely routes of exposure. The SDS should indicate if the information is unknown.
- Description of the delayed, immediate, or chronic effects from short- and long-term exposure.
- The numerical measures of toxicity - the estimated amount of a substance expected to kill 50% of test animals in a single dose (LD50).
- Description of the symptoms. This description includes the symptoms associated with exposure to the chemical including symptoms from the lowest to the most severe exposure.
- Indication of whether the chemical is a potential carcinogen.

**Sections 12-15** - \*Note: Since other Agencies regulate this information, OSHA does not enforce Sections 12 through 15.

**Section 16: Other Information** - This section indicates when the SDS was prepared or when the last known revision was made. The SDS may also state where the changes have been made to the previous version. You may wish to contact the supplier for an explanation of the changes. Other useful information also may be included here.

**4. In which section of the SDS would you find a description of the delayed, immediate, or chronic effects from short- and long-term exposure?**

- a. Section 9: Physical and Chemical Properties
- b. Section 10: Stability and Reactivity
- c. Section 11: Toxicological Information
- d. Section 16: Other Information

### SDS Management

Below are some more important requirements manufacturers, importers and distributors must meet.

The manufacturer or importer must:

- Prepare one SDS that applies to all similar mixtures where complex mixtures have similar hazards and contents (i.e. the chemical ingredients are essentially the same, but the specific composition varies from mixture to mixture).
- Ensure that the SDS information recorded accurately reflects the scientific evidence used in making the hazard classification.
- Add new information to the SDS within six months after becoming aware of any significant new information regarding the hazards of a chemical, or ways to protect against the hazards.
- If the chemical is not currently being produced or imported, add any new information to the material SDS before the chemical is introduced into the workplace again.
- Provide an appropriate SDS with the initial shipment, with the first shipment after a SDS is updated, and as requested by the employer or distributor.
- Provide SDSs with the shipped containers, or send them to the other distributor or employer prior to or at the time of the shipment.
- Retail distributors selling hazardous chemicals to employers having a commercial account must:
  - provide a SDS to such employers upon request, and

- post a sign or otherwise inform them that a SDS is available.

**5. How soon must manufacturers add new information to an SDS after becoming aware of any significant new information regarding the hazards of a chemical, or ways to protect against the hazards?**

- a. Within 30 days
- b. Within six months
- c. Immediately
- d. As soon as possible

### Employer Responsibilities

- **Employers must obtain a SDS from the chemical manufacturer or importer as soon as possible** if the SDS is not provided with a shipment that has been labeled as a hazardous chemical.
- **Employers must maintain SDSs in their workplace** and must ensure that they are readily accessible during each work shift to employees when they are in their work area(s).
- **Electronic access and other alternatives to maintaining paper copies of the SDS are permitted** if no barriers to immediate employee access in each workplace are created by such options. Make sure employees know how to quickly access SDS information that is stored on computers or online.
- Where employees must travel between workplaces during a work shift, i.e., their work is carried out at more than one geographical location, the **SDSs may be kept at the primary workplace facility**. In this situation, the employer must ensure that employees can immediately obtain the required information in an emergency.
- Employees who work at more than one site during the work shift must be able to obtain SDS information immediately (within seconds) **in an emergency**.
- SDSs may be kept at the primary workplace facility, if the employer always has a representative available to ensure **ready access** (within a few minutes) to this information. This is the only situation in which an employer can transmit hazard information via voice communication. The employer must address in the written hazard communication plan how SDS information will be conveyed to remote worksites.

- **SDSs may be kept in any form**, including operating procedures, and may be designed to cover groups of hazardous chemicals in a work area where it may be more appropriate to address the hazards of a process rather than individual hazardous chemicals.

**6. Where must SDSs be maintained during each work shift?**

- a. Where unauthorized persons cannot have access
- b. In a locked cabinet to protect the data
- c. In a centralized office area at each worksite
- d. Where they are readily accessible in work areas

### Training Requirements

Employees must receive information and training that ensures their awareness of the chemical hazards used in their work area. Employers also must provide this information when an employee is initially assigned to a work area where hazardous chemicals are present and before assignments involving new exposure situations.

Employees must be informed of:

- the requirements of the HCS 2012
- any operations in their work area where hazardous chemicals are present
- the location and availability of the written hazard communication program (including the required list(s) of hazardous chemicals and SDSs required by the HCS)

To make sure all training requirements are met, we recommend reviewing each section of the SDS. Group discussion and examples can be effective training strategies to make the training more interesting to students. Demonstration and practice using PPE for properly using and cleaning up spills is especially important.

**7. To be most effective, safety data sheet (SDS) training should \_\_\_\_\_.**

- a. be completed within two weeks of employment
- b. be conducted one-on-one
- c. consist of primarily instructor lecture

d. include demonstration and practice

### Training Topics

Information and training may be designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical-specific information must always be available through labels and SDSs.

Employee training must include at least:

- Methods and observations that may be used to **detect the presence or release of a hazardous chemical** in the work area.
- **The physical, health hazards, simple asphyxiation, combustible dust, and pyrophoric gas hazards**, as well as hazards not otherwise classified, of the chemicals in the work area.
- The **measures employees can take to protect themselves** from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.
- The **details of the hazard communication program** developed by the employer includes an explanation of the labels received on shipped containers and the workplace labeling system used by their employer; the safety data sheet, including the order of information and how employees can obtain and use the appropriate hazard information.

**8. Hazard communication training must include specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals.**

- a. True
- b. False

### Training at Multi-Employer Worksites

The training requirements also apply if the employer becomes aware via the multi-employer worksite provision of exposures of his/her employees to hazards for which they have not been previously trained.

### Training Temporary Employees

Training temporary employees is a responsibility that is shared between the host employer and temporary agency.

- **Host Employer:** The host employer is responsible for training on the company's HCS program requirements including specific labeling, chemical hazards and safe work procedures in their workplace.
- **Temporary Agency:** The temporary agency, in turn, maintains a continuing relationship with its employees and would be expected to inform employees of the general requirements of the HCS standard.

Contracts between the temporary agency and the host-employer should be examined to determine if they clearly set out the training responsibilities of both parties, to ensure that the employers have complied with all requirements of the regulation.

**9. Who is responsible for training specific requirements of the company's hazard communication program to temporary employees?**

- a. The temporary agency
- b. The host employer
- c. A third-party contractor
- d. Either the employer or temporary agency

## Training for Emergencies

A frequently overlooked portion of the training provisions is that dealing with emergency procedures. In workplaces where there is a potential for emergencies, the employer's HCS training program would have to address the HAZWOPER emergency response plan and/or emergency action plan.

The scope and extent of employee training regarding emergency procedures will depend upon the employer's Emergency Response Plan (ERP).

- If the employer merely intends to evacuate the work area, the training in emergency procedures could be limited to, for example, information on the emergency alarm system in use at the worksite, evacuation routes, and reporting areas as detailed in the employer's emergency action plan under [1910.38, Emergency Action Plans](#).
- Where employees are expected to moderate, or control the impact of the emergency in a manner like an emergency responder, training under [1910.120, Hazardous Waste and Emergency Operations \(HAZWOPER\)](#), would be required.

**10. If employees are expected to evacuate in response to a chemical spill or fire, which emergency plan would be activated?**

- a. Emergency action plan
- b. Emergency operations plan
- c. Fire response plan
- d. Emergency evacuation plan