



SDS and Hazard Communication 160

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Class Outline

Objectives
Hazard Communication
What Is a Chemical?
Classification of Chemical Hazards
Physical Hazards
Health Hazards
Target Organ Hazards
Hazard Determination
Labeling Requirements
Labeling Requirements
Labeling Exceptions
Basic SDS Requirements
Safety Data Sheets, Part I
Safety Data Sheets, Part II
Safety Data Sheet Distribution Requirements
Training Requirements
Hazard Communication Program
Hazard Communication Requirements: Inventory
Hazard Communication Requirements: Labeling
Hazard Communication Requirements: SDS
Hazard Communication Requirements: Training
Summary

Lesson: 1/22

Objectives

- Describe the purpose of hazard communication.
- Define chemical.
- Identify chemical hazard classifications.
- Identify types of physical hazards.
- Identify types of health hazards.
- Identify types of target organ hazards.
- Identify the steps chemical manufacturers and importers use to make hazard determinations.
- Describe OSHA's labeling requirements for hazardous chemicals.
- Describe instances in which chemicals do not require labeling.
- Identify basic requirements for SDS.
- Describe OSHA's requirements for SDS content.
- Describe SDS distribution requirements.
- Describe the hazardous chemical information and training requirements.
- Describe the hazard communication program.
- Describe the hazardous chemical inventory.
- Describe the labeling requirements necessary for a hazardous communication program.
- Describe the SDS requirements necessary for a hazardous communication program.
- Describe the training requirements necessary for a hazardous communication program.



Figure 1. Hazard communication helps employees understand the dangers of the chemicals they use.

Lesson: 2/22

Hazard Communication

According to the Occupational Safety and Health Administration (OSHA), there are an estimated 650,000 different chemical substances used in workplaces across the United States. Using chemicals is often an unavoidable part of the job, and millions of workers are exposed to chemicals that can cause or contribute to injuries, illness, and death. To help keep employees safe and healthy, OSHA requires that employers use the **hazard communication** standard as a programmatic way to share information about hazardous chemicals in the workplace.

To help employers properly communicate information about hazards, OSHA created the **Hazard Communication Standard** (HCS), which was last updated in 2012. The new HCS is consistent with the United Nations **Globally Harmonized System** (GHS) of Classification and Labeling of Chemicals, which establishes uniform requirements to ensure that all chemicals produced in, imported to, or used by companies within the United States are properly evaluated.

The HCS further requires communication of these evaluation results to employees through **labels**, **safety data sheets** (SDS), and training specific to every chemical used in the workplace. Employers also are required to create a written hazard communication program outlining how these HCS requirements will be met within the workplace, and they must share this plan with their employees.

Workplaces must be fully compliant with the new standards by June 2016.



Figure 1. The OSHA Hazard Communication Standard has been updated to the Globally Harmonized System. Courtesy of OSHA.



Figure 2. More than 650,000 different chemicals are used in workplaces across the U.S.

Lesson: 3/22

What Is a Chemical?

A **chemical**, as defined by the GHS and HCS, is any **substance**, or mixture of substances. A **mixture** is a combination of two or more substances that are physically combined but do not react.

This broad definition from HCS means that just about any substance on earth qualifies as a chemical. However, just about any substance on earth can be hazardous to humans if they are exposed to excess quantities for extended periods.

OSHA does not control every substance. For example, OSHA does not cover **hazardous waste**, food or alcoholic beverages, drugs, cosmetics, or most finished products, such as plastic bottles or furniture. Wood or wood products are not covered unless they have been treated with a substance that is covered by OSHA, or if they will be cut or sawed and thus generate dust.

Consumer chemicals such as household cleaners that are used in the same way a home consumer would use them are not covered even though they may contain regulated substances. The labeling and use of these products is covered by other branches of the U.S. government. These substances still should be used responsibly in the workplace.



Figure 1. According to the GHS / HCS standard, salt and water are each defined as chemicals. When combined, saltwater is considered a mixture, because the two chemicals do not react with each other.



Figure 2. Common chemicals that are also available for household use are regulated differently and not subject to the new HCS.

Lesson: 4/22

Classification of Chemical Hazards

Chemical hazards are classified in two ways: **physical hazards** and **health hazards**. Physical hazards can cause bodily harm or injuries, such as irritation or burns. A health hazard causes either an acute reaction, such as an allergic reaction or sudden illness, or a chronic effect. Certain health hazards only affect particular organs in the body; these are called **target organ hazards**.

When a substance is capable of causing any of these, this fact must be communicated to everyone who may come in contact with that substance. Because the labels and SDS that accompany most chemicals allow for only short descriptions, the specific nature of the hazard must be communicated in as few words as possible.



Figure 1. Corrosives, explosive chemicals, and flammable chemicals are considered physical hazards. Above are the GHS pictograms for these hazards.



Figure 2. Cadmium is a chemical that can cause cancer, so it is considered a health hazard.

Lesson: 5/22

Physical Hazards

Physical hazards are defined as chemicals that pose any of the following risks:

- **Fire hazards** are likely to burn or support fire. They may be labeled combustible or flammable, or they may be described as an **oxidizer** or a **pyrophoric**.
- **Explosion hazards** are likely to "blow up" or release pressure that can harm bystanders. These may be labeled explosive or **compressed gas**.
- **Reactive hazards** can spontaneously catch fire by reacting on their own or by being exposed to water. These may be described as **corrosive** to metal, **water reactive**, **self-heating**, or **organic peroxide**.

Chemicals can exist in any form, as gases, aerosols, liquids, or solids.



Figure 1. The GHS pictogram for fire hazard that will appear on labels and signs.



Figure 2. The GHS pictogram for explosion hazard.

Lesson: 6/22

Health Hazards

A health hazard is a chemical that is capable of causing an **acute reaction**, a **chronic effect**, or both when the body is exposed through inhalation, ingestion, or absorption. In addition, health hazards can cause a **systemic effect** that affects the body as a whole, or they can harm a particular organ or system.

The following are examples of systemic effects:

- An **irritant** may cause inflammation and swelling in human tissue.
- A **sensitizer** may cause an allergic reaction.
- A **corrosive** may cause visible destruction to or permanent alteration of human tissue.
- A **carcinogen** may cause cancer.
- A **toxic agent** is a chemical shown to cause death in lab rats at a relatively "high" **dosage**.
- A **highly toxic agent** is a chemical shown to cause death in lab rats at a relatively "low" dosage.

Although chemicals can cause systemic reactions to specific areas of the body, they are considered systemic because they will affect any part of the body that is exposed.



Figure 1. The GHS pictogram for health hazards.

Lesson: 7/22

Target Organ Hazards

Chemicals that affect specific organs or systems are considered target organ health hazards because only a specific organ or system is affected.

The following terms are used to describe chemicals that cause target organ effects:

- A **hepatotoxin** may cause liver damage.
- A **nephrotoxin** may cause kidney damage.
- A **neurotoxin** may affect the **nervous system**, including brain function.
- A **blood toxin** or **hematopoietic toxin** may damage the blood or blood production.
- A **respiratory toxin** may damage the lungs.
- A **reproductive toxin** may cause damage to the reproductive systems of males or females.
- A **cutaneous hazard** can damage the skin.
- An **eye hazard** can damage the eyes, especially the **cornea**.

An awareness of the chemicals used in the workplace can help keep employees safe. For example, many hazardous chemicals can become **airborne** by being sprayed or blown with a fan, and coworkers could be breathing in hazardous chemicals without knowing it.



Figure 1. When working with respiratory toxins, employees must wear breathing equipment to prevent damage to their lungs.

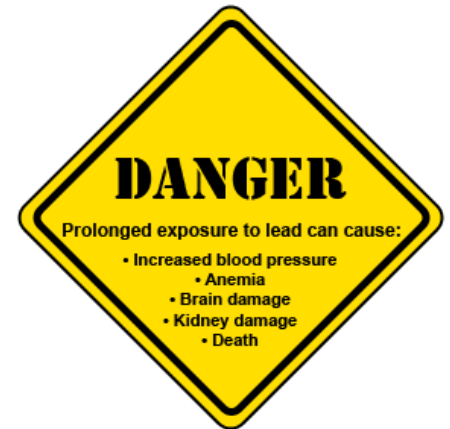


Figure 2. Workplace signage should include information about the specific hazards to employees.

Lesson: 8/22

Hazard Determination

Employers and other users of chemicals are allowed to perform tests to determine what types of hazards the chemicals may present. However, the responsibility for determining whether or not a chemical is hazardous lies with chemical manufacturers and chemical importers.

To determine whether or not a chemical is hazardous and to consider all possible health hazards, the HCS requires manufacturers and importers to follow a four-part process:

1. Select the chemicals to evaluate, including all the chemicals, additives, and impurities that may be present if it is a mixture.
2. Collect data for each chemical.
3. Analyze the data.
4. Document the hazard determination process and the results.

OSHA does not require testing of chemicals for which there is already established data. Instead, manufacturers and importers may use OSHA-approved sources, such as certain chemical encyclopedias and scientific texts. If a chemical is a mixture that has not been tested as a whole, the manufacturer or importer may assume that the hazards of the individual chemical components apply to the whole mixture. Many manufacturers and importers will perform independent testing and collect their own data. However, whether the data is collected from existing sources or independent testing, a **toxicologist** or **industrial hygienist** will carry out the data analysis.



Figure 1. Once hazards have been identified, they must be clearly indicated. Proper PPE must be provided to workers.

Lesson: 9/22

Labeling Requirements

Once the data necessary for a hazard determination is analyzed, the results must be communicated to users of these substances. Chemical manufacturers, importers, and **distributors** must be sure that every chemical container is properly labeled, marked, or tagged with the appropriate information. This includes the chemical's identity, appropriate hazard warnings, and the name and address of the manufacturer or other source for the chemical.

Once chemicals reach the workplace or jobsite, it is the employer's responsibility to make sure chemicals are properly labeled. Labels for chemical containers within the workplace must be tagged with the identity of the hazardous contents, as well as any hazard warning that is appropriate for employee protection.



Figure 1. Once hazardous chemicals reach the workplace, it is the employer's responsibility to ensure they are properly labeled.

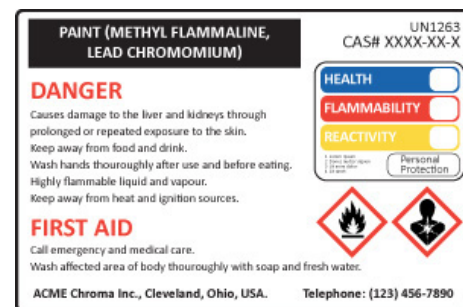


Figure 2. GHS labeling must include the required elements, but can also include additional information about the hazards.

Lesson: 10/22

Labeling Requirements

The HCS 2012 standard requires that labels have the following information:

- **Product Identification** includes the name or number for a hazardous chemical. It must provide information that can be cross-referenced with the written hazard communication program, the SDS, and the label.
- A **Signal Word** is used to indicate the level of severity of the hazard. "Warning" indicates a less severe hazard; "Danger" indicates a more severe hazard.
- The **Hazard Statement** describes the hazard and degree of hazard. It also identifies the hazard class and category of hazard.
- A **Pictogram** is a symbol designed to give more specific information about the hazards. These are easily recognizable, and do not require viewers' ability to read English. There are eight pictograms designated for use on labels.
- The **Precautionary Statement** is a phrase that recommends how to minimize the effects of exposure.
- **Responsible Party Contact Information** includes the name, address, and phone number of the manufacturer, importer, or other responsible party.

HCS 2012 is a significant revision of the standard because HCS 1994 did not require the use of signal words, pictograms, or precautionary statements.



Figure 1. Three of the new pictograms for hazard identification: flammable (oxidizer), compressed gas, and toxic. The new symbols must have a diamond-shaped border in red.

SAMPLE LABEL	
PRODUCT IDENTIFIER	HAZARD PICTOGRAMS
CODE Product Name	
SUPPLIER IDENTIFICATION	SIGNAL WORD
Company Name Street Address City, State Postal Code, Country Emergency Phone Number 1 800-888-8888	Danger
PRECAUTIONARY STATEMENTS	HAZARD STATEMENT
Keep container tightly closed. Store in cool, well ventilated place that is locked. Keep away from heat/sparks/open flame. No smoking. Only use non-sparking tools. Use explosion-proof electrical equipment. Take precautionary measure against static discharge. Ground and bond container and receiving equipment. Do not breathe the vapors. Wear protective gloves. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Dispose of in accordance with local, regional, national, international regulations as specified.	Highly flammable liquid and vapor. May cause liver and kidney damage.
In Case of Fire use dry chemical (BC) or Carbon dioxide (CO2) fire extinguisher to extinguish.	SUPPLEMENTAL INFORMATION
First Aid If exposed call Poison Center. If on skin (on hair): Take off immediately any contaminated clothing. Rinse skin with water.	Directions for use: _____ _____ _____
	Fill weight <input type="text"/> Lot Number
	Gross weight <input type="text"/> Fill Date
	Expiration Date 12/12/20XX

Figure 2. This sample GHS label includes the required information.

Lesson: 11/22

Labeling Exceptions

Workplace containers must have labeling that meets the HCS 2012 requirements, so NFPA 704 and HMIS labels are permitted, as long as any pictograms or hazard warnings are consistent with the newer standard.

If there is a designated area in a workplace that has stationary process containers, a sign is sufficient. Employers are permitted to substitute labels with other documents, such as **batch tickets**, as long as they include the same information in the same format required for a label.

There are times when individual chemical containers at a worksite or facility do not require labels. If a chemical is transferred to a portable container for immediate use the smaller container does not have to be labeled. However, writing the name of the substance on the container helps to avoid confusion. Pipes that contain or transport hazardous chemicals are required to be labeled with the contents, but may be shortened to be simple and easy to read and understand. They must also be labeled with the direction of flow.



Figure 1. Though exempt from new labeling requirements, portable containers must still conform to other safety standards, particularly regarding flammable materials.

Lesson: 12/22

Basic SDS Requirements

A **safety data sheet** (SDS), formerly a Material Safety Data Sheet (MSDS), is a detailed information bulletin prepared by chemical manufacturers or importers to inform users about the specific data available for a chemical. The information on an SDS is more detailed than the information found on most labels. Each hazardous chemical produced or imported must have its own SDS.

An SDS must be written in English, and must clearly identify the chemicals or hazardous ingredients by both their common names and chemical names. Under the new GHS standard, it is required that all SDS adhere to the same 16-section format containing the same applicable information in the same order and presentation.

1. Product and Company Identification	
Product Code:	10000001-0010
Product Name:	Solvent (Highly Flammable)
Reference ID:	MSDS
Company Name:	Chemical Solutions Systems, Inc. 12345 Industrial Blvd. Springfield, MA 01103
Emergency Contact:	(404) 422-2071
Information:	8/15/17 © 2016
Product Category:	Solvents
2. Hazards Identification	
Flammable Liquids, Category 2	
Serious Eye Damage/Eye Irritation, Category 2A	
Target Organ Systemic Toxicity (High Exposure), Category 3	
GHS Hazard Phrases:	H225: Highly flammable liquid and vapor H318: Causes serious eye irritation H336: May cause respiratory irritation
GHS Precaution Phrases:	P233: Keep container tightly closed P235: Keep away from heat/spark/open flames/hot surfaces - No smoking P280: Wear protective gloves/protective clothing and eye/face protection as specified by the manufacturer/supplier or the competent authority P240: Ground/bond container and receiving equipment - if the explosion is electrostatically sensitive P241: Use explosion-proof electrical/venting/lighting/... equipment, other specified by the manufacturer/supplier or the competent authority - if dust clouds can occur P243: Take precautionary measures against static discharge P242: Use only non-sparking tools P264: Wash hands thoroughly after handling P271: Use only outdoors or in a well-ventilated area P281: Avoid breathing dust/fume/gas/aerosol/vapors
GHS Response Phrases:	P370+P376: In case of fire, use ... for extinction ... appropriate media specified by the manufacturer/supplier or the competent authority - if water increases risk P303+P361+P531: IF ON SKIN (or hair): Remove/leave off immediately all contaminated clothing. Rinse skin with water/shower P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing P303+P313: IF SWALLOWED: Get medical advice/attention P309+P311: Call a POISON CENTER or doctor/hospital if exposed or you feel unwell P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
GHS Storage and Disposal Phrases:	P403+P233: Store in cool/dry/ventilated place P501: Dispose of contents/container to ... (in accordance with local/regional/national/international regulations) P405: Store locked up P403+P233: Store container tightly closed in well-ventilated place - if product is as volatile as to generate hazardous atmosphere
MSDS 10001, © 2016 V Systems, Inc. GHS label	

Figure 1. The GHS Safety Data Sheet is meant to provide the same hazard information regardless of where the hazardous chemicals are in use. All SDS should be located so that all employees have access. They can be provided electronically as well.

Lesson: 13/22

Safety Data Sheets, Part I

The HCS 2012 requires that all SDS must contain specific information under 16 required headings about the chemicals they describe and the hazards they present. The required SDS categorizes this information as follows:

- Section 1, "Identification," contains the product identification as used on the label, details its uses and restrictions, and must have contact information for the manufacturer, importer, or other responsible party including an emergency contact phone number.
- Section 2, "Hazard Identification," must include the classification of the hazard according to HCS 2012 (paragraph d, and appendices A and B), a signal word and any symbols, and any unclassified hazards.
- Section 3 describes the composition of, or information about, ingredients.
 - For substances, this includes the chemical name and common name or synonyms of the substance, the assigned CAS number, and any additives or stabilizers that are also classified.
 - For mixtures, this includes additional information such as chemical names and specific concentration levels of any classified ingredient or a range of concentrations if a trade secret is claimed by the manufacturer.
- Section 4, "First Aid Measures," gives a description of necessary treatment measures, acute or delayed symptoms, and any special treatment or medical attention necessary.
- Section 5, "Firefighting Measures," describes appropriate and inappropriate extinguishing compounds, special PPE for firefighters, and any special hazards due to burning the chemical.
- Section 6, "Accidental Release Measures," describes emergency procedures and precautions in the event of spills or release, and recommends containment and cleanup methods.



Figure 1. The GHS Safety Data Sheet must include signal words that indicate the extent of hazard.



Figure 2. Section 2 of the SDS will list every possible hazard related to the use of a given chemical. For example the SDS for the materials used in welding warn of the hazards of toxic fumes.

Lesson: 14/22

Safety Data Sheets, Part II

The next group of SDS sections includes the following:

- Section 7, "Handling and Storage," describes procedures for safe handling and safe storage.
- Section 8, "Exposure Controls and Personal Protection," details the OSHA permissible exposure limit and the American Conference of Governmental Industrial Hygienists threshold limit value for exposure. It also includes a description of any engineering controls and necessary PPE.
- Section 9, "Physical and Chemical Properties," describes properties including appearance, odor, odor threshold, pH, melting and freezing points, boiling point and range, flash point, evaporation rate, flammability (whether solid or gas), and solubility, among others.
- Section 10, "Stability and Reactivity," discusses reactivity, chemical stability, the possibility of hazardous reactions, conditions to avoid such as static discharge, shock, or vibration, and any incompatible materials.
- Section 11, "Toxicological Information," describes health effects, routes of exposure, all symptoms, any immediate, delayed, and chronic effects, and toxicity measurements, and includes the listing in the National Toxicity Program Report on Carcinogens or the International Agency for Research on Cancer Monographs.

Sections 12 through 15 may list additional information such as ecological, disposal, transport, and regulatory considerations, but are not required by OSHA. OSHA does not enforce the information in these sections because they are regulated by other agencies. Section 16 contains any other previously undisclosed information such as date of preparation or revision.

If no relevant information exists for a category, the SDS must be marked to indicate this fact. However, most chemicals present multiple hazards, so most categories of an SDS will contain important information.



Figure 1. Sections 7 and 8 of the SDS outline requirements for handling a given chemical and any necessary PPE. Gloves are one of the most common PPE items required when handling hazardous chemicals.



Figure 2. Section 7 of the SDS details safe storage methods for hazardous chemicals.

Lesson: 15/22

Safety Data Sheet Distribution Requirements

Employees who could be exposed to hazardous chemicals must have access to SDS. OSHA has very specific rules about how and when SDS must be distributed. First, the chemical manufacturers and importers are required to prepare and disseminate SDS for each of their chemicals. An SDS must accompany the initial shipment of any chemical to an employer and any subsequent shipment any time the SDS is updated or revised.

In shop or manufacturing settings, SDS must be available to employees at all times. The SDS can be located on computer terminals as long as employees are able to access it at all times. On construction sites, the SDS is usually placed in a temporary trailer or the vehicle of a designated employee. In the case where employees must travel between worksites, the employer must ensure they are able to receive SDS information remotely and have access to the hard copy at the primary worksite when they return.

Employees also may ask for copies of SDS for any chemicals to which they may be exposed. For example, providing an SDS to their doctor may help with a diagnosis.



Figure 1. The employer must maintain a hazard communication plan, and must contact the manufacturer, importer, or supplier if an SDS is missing or outdated.

Lesson: 16/22

Training Requirements

Every employee who may be exposed to hazardous chemicals must receive information and training before having any contact with the substances used in the workplace. After the initial training has been completed, annual training must also be completed for all employees. Information and training provided to employees must cover general hazardous chemical topics, as well as information specific to the chemicals used in the workplace, including the physical and health hazards they present, and the methods for detecting the presence or release of a chemical in the work area, such as visual appearance or odor. Employees must also be informed about measures they can take to protect themselves, including which **personal protective equipment (PPE)** must be used.

Employees must be informed about the requirements of the HCS itself, as well as the details of the employer's written hazard communication program. In addition, employees must be told the location of the HCS policy and the location of the SDS notebook.



Figure 1. Employees must be informed of the hazardous chemicals in the workplace, and trained in the use of appropriate PPE.

Lesson: 17/22

Hazard Communication Program

Every company that uses hazardous chemicals is required by the HCS to develop a written hazard communication program that describes how the standard will be implemented in the workplace. The program itself does not have to be overly detailed. In fact, many industry **trade associations** have skeleton plans on which companies base their programs. However, any hazard communication plan must be adapted to a workplace so that it reflects what actually occurs in the company. In the event that the company is the focus of an OSHA inspection, the **compliance officer** will look for evidence that the company is complying with all the requirements of its HCS.

Whether a company has an existing hazardous communication program or is developing one, employees may be called upon to contribute to the process. An effective hazard communication program must be an ongoing process, which requires methods for identifying hazardous chemicals in the workplace and assuring that labels and SDS are present and accurate. To be effective, the program must involve staff members at all levels to monitor how chemicals are stored, labeled, and used.



Figure 1. Part of any hazard communication program is a requirement that the procedures for regulated chemicals remain up-to-date. The labeling on this hazardous waste drum may not need to change because the waste is not regulated by OSHA.

Lesson: 18/22

Hazard Communication Requirements: Inventory

The HCS does not have any requirements for the organization or format for a hazard communication program, but it does have requirements for the content. The first requirement of a hazard communication program is that it must include a written inventory of the hazardous chemicals present in the workplace. The inventory is the basis for the rest of the hazard communication program. Using the inventory, employers can match each chemical in the workplace with its SDS. From there, employers also can make sure that employees have the necessary training and PPE for each chemical on site.

OSHA advises employers to assign designated staff members to inventory the worksite and identify all chemicals present. The inventory should begin with a walk-through of the facility. In addition to the obvious chemicals in containers, consider other sources of hazardous chemicals, such as process byproducts like fumes and dust containing particles of hazardous substances. Note the chemical locations and major hazards they present, if known.

After identifying all chemicals present during a walk-through, employers compare the list of chemicals compiled from the walk-through with any paperwork that might exist such as invoices or purchase orders. This helps employers find chemicals they may have missed.



Figure 1. The first step in any hazard communication program is to take an inventory of all the chemicals in use at a facility.

Lesson: 19/22

Hazard Communication Requirements: Labeling

OSHA requires that all in-plant containers of hazardous chemicals must be labeled, tagged, or marked with the name of the substance and the appropriate hazard warnings. However, OSHA's labeling requirements do not stop there. In the event of an inspection, compliance officers will review the hazard communication program for very specific information regarding labeling.

To ensure that labeling procedures are properly implemented, OSHA requires that the hazard communication program contains, in writing:

- A list of the designated employees responsible for ensuring that in-plant containers are labeled.
- An indication of the employee or employees responsible for ensuring that any shipped containers of chemicals are labeled.
- A description of the labeling system used.
- A description of written alternatives to labeling of in-plant containers, if used.
- Procedures to review and update label information when necessary.

The employee designated to ensure correct labeling procedures will be responsible for this portion of the written hazard communication program. However, anyone must inform a supervisor if a label is missing or incorrect. Chemicals that are unlabeled or that have damaged or illegible labels should not be used.



Figure 1. Once the hazard inventory and communication plan have been made, the designated compliance officer will have the responsibility to ensure that labeling remains up-to-date.

Lesson: 20/22

Hazard Communication Requirements: SDS

The most important part of the SDS portion of the written hazard communication program is that someone is responsible for obtaining and maintaining the SDS for every hazardous chemical in the workplace. In addition, OSHA requires that the written program must include:

- A description of how the SDS are to be maintained, such as in a notebook or a computer terminal, and how employees may access them.
- Procedures to follow in the event that the SDS is not received at the time of the first shipment of a chemical.
- Procedures for producers of chemicals to follow for updating SDS when new and significant health information is found.
- A description of alternatives to actual SDS if they are used in the workplace.

The employee designated to obtain and maintain SDS will be responsible for this portion of the written hazard communication program. If an SDS is missing or outdated, the manufacturer, importer, or supplier should be contacted. In fact, many companies now include the name and contact information for the employee designated to maintain SDS on their purchase orders. Any employee must inform a supervisor if an SDS is missing or outdated.

SAFETY DATA SHEET	
Reference: HAZ-1000	
Page: 1 Printed: 05/20/2015 Revision: 04/12/2015	
1. Product and Company Identification	
Product Code:	00000001-0000
Product Name:	Solvent Wipe Off (S)
Reference #: :	00000001-0000
Company Name:	TOOLINGU Corporation, Systems Inc. 10000 Old Mill Road Montgomery, PA 19146
Emergency Contact:	Emergency (856)422-2071
Information:	(610)373-2020
Product Category:	Solvents
2. Hazards Identification	
Flammable Liquids, Category 2 Serious Eye Damage/Eye Irritation, Category 2A Target Organ Systemic Toxicity (Single Exposure), Category 3	
	
GHS Hazard Phrases: H226: Highly flammable liquid and vapor H318: Causes serious eye irritation H336: May cause respiratory irritation	
GHS Precaution Phrases: P233: Keep container tightly closed P237: Keep away from heat/sparks/open flames/hot surfaces - No smoking P280: Wear protective gloves/protective clothing and eye/face protection as specified by the manufacturer/supplier or the competent authority P240: Ground/bond container and receiving equipment - if the explosion is electrostatically sensitive P241: Use a system of electrical earthing/lightning equipment, other specified by the manufacturer/supplier or the competent authority - if dust clouds can occur P243: Take precautionary measures against static discharge P264: Use only non-flammable liquids P274: Wash hands thoroughly after handling P271: Use only outdoors or in a well-ventilated area P281: Avoid breathing dust/fume/gas/aerosol/vapors	
GHS Response Phrases: P303+P361+P531: In case of fire, use - for extinction - appropriate media specified by the manufacturer/supplier or the competent authority - if water increases risk P309+P312: IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower P332+P313: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing P337+P313: IF eye irritation persists, get medical advice/attention P338+P313: IF eye irritation persists, get medical advice/attention P362+P352: IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower P391: Avoid breathing dust/fume/gas/aerosol/vapors P403+P233: Store in cool/dry-ventilated place P501: Dispose of contents/container to (in accordance with local/regional/national/international regulations) P605: Store locked up P603+P233: Store container tightly closed in well-ventilated place - if product is as volatile as to generate hazardous atmosphere	
GHS Storage and Disposal Phrases: P403+P233: Store in cool/dry-ventilated place P501: Dispose of contents/container to (in accordance with local/regional/national/international regulations) P605: Store locked up P603+P233: Store container tightly closed in well-ventilated place - if product is as volatile as to generate hazardous atmosphere	
HAZ-1000, ©2014 Tooling U Systems, Inc. GHS Label	

Lesson: 21/22

Hazard Communication Requirements: Training

The HCS requires that every employee who may be exposed to a hazardous chemical must be provided with information and training prior to first working with the chemical as well as annually thereafter. If there are few chemicals in use, training can be tailored to those specific chemicals. If there are many chemicals in use, training may be tailored to general hazard categories, such as flammability.

The HCS does not require or even expect that employees will be able to retain every bit of information about all the chemicals in the workplace. However, all employees are expected to know how to read and use labels and SDS and follow proper safety procedures.

In the event of an inspection or audit, compliance officers may ask employees if they have received training, if they know that they may be exposed to hazardous chemicals, and if they know how to find specific information about chemicals by reading labels and SDS. Employees' ability to answer these questions helps the audit process, but more importantly, it helps keep everyone safe in the working environment.



Figure 1. It is a legal responsibility of every employer to provide hazard information and training to all employees who may come in contact with hazardous chemicals.

Lesson: 22/22

Summary

Every day, millions of workers face exposure to hundreds of thousands of potentially hazardous chemicals. To help keep employees safe, OSHA has written standards requiring chemical manufacturers and importers to investigate the hazards of the chemicals they sell and inform users through labeling and SDS. OSHA's standards also require that employers establish a written hazard communication program that informs employees of the dangers of the chemicals they use and trains them to protect themselves.

Chemical hazards are classified as physical hazards or health hazards. One of the purposes of labels and SDS is to inform employees of these specific hazards. Because labels and SDS are so important, OSHA has requirements for the format, content, and dissemination of this information. All SDS must identify substances by their chemical and common names, and must describe each chemical's specific hazard, such as "corrosive" or "carcinogenic."

Employees who may be exposed to hazardous chemicals must have access to up-to-date SDS stored in a central location. Prior to having any contact with hazardous substances used in the workplace, employees must receive information and training that covers general hazardous chemical topics, as well as information specific to the chemicals used in the workplace.

Employees must also have access to the written hazard communication program so they may know how the standard will be implemented in the workplace and what responsibilities they may have. The written program must outline how staff members at all levels are involved in monitoring how chemicals are stored, labeled, and used. All employees must be responsible for knowing how to access information that will help keep them safe when using hazardous chemicals.

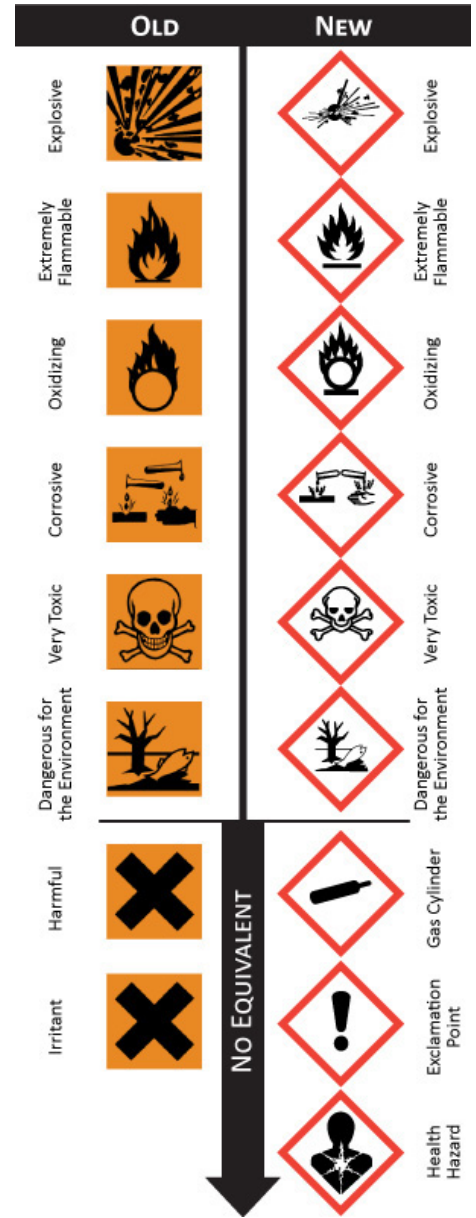


Figure 1. On the left are examples of older pictograms that are being replaced by the pictograms on the right. Before the GHS, there were fewer requirements for uniformity in hazard communication. Now, all hazard communication uses the same warnings and symbols.

Class Vocabulary

Acute Reaction	A response to chemical exposure that occurs suddenly or over a short period of time.
Airborne	A substance that is moved through or by the air. Dust and mist are examples of airborne substances.
Batch Ticket	The documentation that accompanies a group or quantity of a product. Batch tickets are often used for inventory control.
Blood Toxin	A chemical that causes damage to or disease in the blood or harms blood production. Blood toxins, known as hematopoietics, can prevent the blood from carrying oxygen to cells.
Carcinogen	A chemical that causes cancer.
Chemical	Any substance, or mixture of substances. Chemicals may be in the form of solids, liquids, or gases, and may consist of an element such as hydrogen, or a combination of elements, such as water, or saltwater.
Chronic Effect	A response to a chemical that occurs after a long period of exposure.
Compliance Officer	An OSHA representative who enforces OSHA standards through inspection and investigation.
Compressed Gas	Any gas held under pressure in a gas cylinder. Gas under pressure may pose a physical hazard from explosion.
Cornea	The clear, outer portion of the eye. The cornea is the covering over the iris.
Corrosive	A chemical that causes visible destruction to or permanent alteration of human tissue. Corrosives will "eat away" skin.
Cutaneous Hazard	A chemical that causes damage to or disease in the skin or dermal layer, which is the body's largest organ.
Distributors	A company or other entity that sells and ships chemicals produced by others to employers and worksites.
Dosage	A measurable amount of exposure to a substance or a hazard.
Explosion Hazards	A chemical that is likely to blow up.
Eye Hazard	A chemical that causes damage to or disease in the eyes.
Fire Hazard	A chemical that is likely to burn or support fire.
Globally Harmonized System	An international standard for communicating chemical hazards through signs, labeling, and safety data sheets. The GHS is intended to provide employees with similar hazard communication information worldwide.
Hazard Communication	The means through which employers inform their employees about hazards in the workplace, including training and SDS.
Hazard Communication Standard	An established OSHA policy that sets guidelines for hazard communication. The HCS emphasizes labeling, SDS, and training, and is aligned with the Globally Harmonized System (GHS).
Hazard Statement	A statement that describes the hazard and its degree. It also describes the hazard's class and category.
Hazardous Waste	Waste that poses a risk to human health or the environment. Hazardous waste requires special

types of storage and disposal to make it harmless or less dangerous.

Health Hazard A chemical that is capable of causing an acute reaction, a chronic effect, or both. Health hazards can affect the whole body or a particular organ.

Hematopoietic Toxin A chemical that damages the blood or blood production. Blood toxins can prevent the blood from carrying oxygen to cells.

Hepatotoxin A chemical that causes damage to or disease in the liver.

Highly Toxic Agent A chemical that has been shown to cause death in lab rats that receive relatively low dosages.

Industrial Hygienist A person trained to anticipate, recognize, evaluate, and develop controls for occupational health and environmental hazards.

Irritant A chemical that causes inflammation and swelling in human tissue. Irritation is generally a short-term effect.

Labels A printed form of identification that is attached to a container. OSHA requires chemical labels to have specific content.

Mixture A substance consisting of two or more separate substances that are mixed. Saltwater is a mixture of salt and water.

Nephrotoxin A chemical that causes damage to or disease in the kidneys.

Nervous System The system that includes the nerves, spinal cord, and brain. The nervous system controls all the body's functions.

Neurotoxin A chemical that causes damage to or disease in the nervous system, which includes the brain and spinal cord.

Organic Peroxide A type of reactive hazard that can catch fire on its own. Organic peroxides are both oxidizers and fuels in one.

Oxidizer Any substance that may trigger or promote flammability in another substance.

Personal Protective Equipment Any example of various safety equipment that workers wear or use to prevent injury in the workplace. Safety glasses are common personal protective equipment (PPE).

Physical Hazard A chemical hazard that can cause bodily harm or injuries such as burns. These injuries may occur when chemicals ignite or explode.

Pictogram An illustration of a hazard, intended to be understood even if the viewer cannot read. There are eight pictograms required for use on labels by the GHS.

Precautionary Statement A statement that offers ways to minimize the effects of exposure. This may be as simple as suggesting particular pieces of PPE for the person exposed.

Product Identification Product identification is required by the HCS 2012 standard. It includes the name or number of a hazardous chemical, information that can be cross-referenced with the written hazard communication program, SDS, and labels.

Pyrophoric A chemical that will ignite or explode spontaneously. Pyrophorics will ignite and support a fire when exposed to air at temperatures at or below 130 degrees F (54.4 deg C), and many react with water.

Reactive Hazards A chemical that is likely to catch fire or explode on its own or when exposed to water.

Reproductive Toxin A chemical that causes damage to or disease in male or female reproductive systems or organs, such as the ovaries, or harms unborn fetuses.

Respiratory Toxin A chemical that causes damage to or disease in the lungs or another part of the breathing system.

Responsible Party Contact Information This information offers ways to connect with the person in charge. This information should include a name, address, and phone number.

Safety Data Sheet SDS. Mandatory information that must accompany almost every chemical in the workplace except for items like cleaning supplies. An SDS includes details such as the hazards, precautions, and first-aid procedures associated with the chemical.

Self-Heating	Any non-pyrophoric substance that will heat up when in contact with air. Self-heating substances will usually ignite only when in large quantities or only after a long period of exposure to air.
Sensitizer	A chemical that causes an allergic reaction, such as hives or breathing problems.
Signal Word	A word that indicates the level of severity of a hazard. "Warning" indicates a less severe hazard, while "danger" indicates a more severe hazard.
Substance	Any chemical element, or combination of elements.
Systemic Effect	A response to chemical exposure that affects the whole body. Systemic illnesses may cause symptoms in one or two areas, but the whole body is affected.
Target Organ Hazard	A response to chemical exposure that affects a particular organ or system, such as the lungs or liver.
Toxic Agent	A chemical that has been shown to cause death in lab rats that receive relatively high dosages.
Toxicologist	A scientist trained to study the nature and effects of chemicals on living organisms.
Trade Associations	A professional group that promotes a particular industry. Trade associations often offer assistance and training to members and develop industry standards.
Water Reactive	A chemical that will explode or catch fire when exposed to water.