



**Hazard Communication
for the Employee**

There are an estimated 650,000 hazardous chemical products and hundreds of new ones are being introduced annually. This poses a serious health and safety hazard for exposed employees. This course will discuss OSHA's Hazard Communication Standard and how employees can protect themselves from the dangers of hazardous chemicals in their work environment.

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OSHAcademy Course 606 Study Guide

Hazard Communication for the Employee

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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 606.

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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Revised: May 8, 2018

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Course 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.

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

Module 1: General Responsibilities

The Hazard Communication Standard

OSHA's Hazard Communication Standard (29 CFR 1910.1200) provides workers exposed to hazardous chemicals with a "right-to-know" the identities and hazards of those materials. Additionally, employees must also be told the appropriate protective measures associated with the hazardous chemicals. When workers have this important information, they are able to take steps to protect themselves from the negative effects caused by accidental exposure.

OSHA's Hazard Communication Standard (HCS) **requires** employers and manufacturers to develop and distribute chemical information as stated 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.
-) All employers with classified hazardous chemicals in their workplaces must have labels and safety data sheets for their exposed workers, and train workers to handle the chemicals appropriately.

This means that even though an employer was not responsible for the manufacturing of the hazardous chemical, the employer has the responsibility for transmitting information about the hazardous chemical to his or her employees.

In 2012, OSHA released an update to the Hazard Communication Standard. 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 the following:

-) provides a common and coherent approach to classifying chemicals and communicating hazard information on labels and safety data sheets
-) improves the quality and consistency of hazard information in the workplace
-) helps reduce trade barriers
-) results in productivity improvements for American businesses that regularly handle, store, and use classified hazardous chemicals
-) provides cost savings for American businesses who periodically update safety data sheets and labels for classified chemicals

The previous HCS 1994 gave workers the right-to-know, but the new HCS 2012 gives workers the right-to-understand. This is an important distinction between the two versions.

In order to ensure chemical safety in the workplace, employers need to provide employees with the information associated with the chemicals they are exposed to (HCS 1994). This information should include any relevant chemical properties, hazards associated with the chemicals, and means to protect oneself from an accidental exposure. Employers also need to check for understanding of this information (HCS 2012). For example, if a chemical is a strong acid, it is not enough for an employee to know the chemical is an acid. The employee needs to understand the hazards of a strong acid and how to protect themselves from the associated hazards.

Hazardous Communication Standard Application

The HCS 2012 applies to **any chemical which is known to be present** in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.

Let's take a closer look at some of the components of this statement.

"Foreseeable emergency" means any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which could result in an uncontrolled release of a hazardous chemical into the workplace.

The phrase "known to be present" is important. If a hazardous chemical is known to be present by the chemical manufacturer or the employer, it is covered by the standard.

"Hazardous chemical" means any chemical which is classified as a physical hazard or a health hazard, such as a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified.

"Employees," such as office workers or bank tellers who encounter hazardous chemicals only in non-routine and isolated instances are not covered. For example, an office worker who occasionally changes the toner in a copying machine would not be covered by the standard. However, an employee who operates a copying machine as part of her/his work duties would be covered by the provisions of the HCS.

Chemicals in Sealed Containers

In work operations where employees only handle chemicals in sealed containers which are not opened under normal conditions of use (such as are found in marine cargo handling, warehousing, or retail sales), employers must:

-) Ensure labels on incoming containers of hazardous chemicals are not removed or defaced.
-) Maintain copies of any safety data sheets that are received with incoming shipments of the sealed containers of hazardous chemicals.
-) Obtain a safety data sheet as soon as possible if sealed containers do not have safety data sheets.
-) Ensure the safety data sheets are readily accessible during each work shift.
-) Provide appropriate information and training about the hazards of the chemicals employees use.
-) Protect employees in the event of a spill or leak of a hazardous chemical from a sealed container.

Chemical Health Hazards

Chemicals that are health hazards can damage an exposed person's tissue, vital organs, or internal systems. Generally, the higher the chemical's toxicity, the lower the amount or dose necessary for it to have harmful effects. The effects vary from person to person, ranging from temporary discomfort to permanent damage. The extent of damage depends upon dose, toxicity, and duration of exposure to the chemical. Health effects range from short-duration symptoms that often appear immediately (acute effects) to persistent symptoms that usually appear after longer exposures (chronic effects). Health effects can be classified by how they affect tissue, vital organs, or internal systems.

Here are a few hazards:

-) carcinogens cause cancer
-) corrosives damage living tissue
-) hematopoietic agents affect the blood system
-) hepatotoxins cause liver damage
-) irritants cause inflammation of living tissue
-) nephrotoxins damage cells or tissues of the kidneys

-) neurotoxins damage tissues of the nervous system
-) reproductive toxins damage reproductive systems, endocrine systems, or a developing fetus
-) sensitizers cause allergic reactions

Scenario

A paint maker (victim) was working by himself using a paint stripper to remove dried paint from the inside of a tank. The stripper contained methylene chloride, methanol, and mineral spirits. The tank was a permit-required confined space. The space was not adequately ventilated and the victim was not trained in confined space entry. There was no attendant at the tank opening to monitor the work process while the victim was in the tank. The victim was wearing a cartridge respirator that did not adequately protect against inhaling methylene chloride vapors.

The victim was observed unresponsive at the bottom of the tank by a co-worker. The co-worker tried to rescue the victim and was overcome by vapors. The high concentration of methylene chloride in the product, the tank configuration, the inadequate ventilation, and the inadequate training and implementation of confined space procedures were contributing factors in this incident. The victim died from exposure to dichloromethane (methylene chloride).

The investigator determined in order to prevent exposure to methylene chloride while cleaning paint tanks, employers should ensure:

1. Policies and procedures are developed and implemented to clean paint tanks more frequently with water-based materials before the paint is cured. If this is not possible, the cured paint should be stripped with abrasive removal methods.
 2. If toxic chemicals must be used inside a tank, employees must be provided with worker training in chemical hazard communication and confined space entry procedures.
-

Module 1 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

- 1. Which of the following is listed as a benefit of the new HCS 2012 and GHS requirements?**
 - a. Provides a common and coherent approach to classifying chemicals
 - b. Helps reduce trade barriers
 - c. More expensive for businesses who update safety data sheets on a regular basis
 - d. A and B are both correct

- 2. The previous HCS 1994 gave workers _____ and the new HCS 2012 gives workers _____.**
 - a. right-to know, right-to understand
 - b. right-to understand, right-to know
 - c. better understanding, more work
 - d. important information, less information

- 3. If a hazardous chemical is known to be present by the manufacturer or the employer, it is not covered by the OSHA standard.**
 - a. True
 - b. False

- 4. The HCS 2012 applies to _____ chemicals known to be present in the workplace.**
 - a. no
 - b. any
 - c. some
 - d. all

5. Which chemical below may cause an inflammation of living tissue?

- a. Corrosives
- b. Carcinogens
- c. Irritants
- d. Sensitizers

Module 2: Container Labeling

Types of Containers

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'll discuss labeling requirements under the old HCS 1994 and the new HCS 2012 (often referred to as GHS) labeling requirements in this module.

We'll take a look at the labeling requirements for each type of container referred to in the hazard communication standard. The various types of container labels that will be discussed include:

-) **Primary** (Shipped) container labels are found on the shipping containers and containers received for use.
-) **Secondary** (Workplace) container labels are found on employer containers, such as a smaller container used to store a chemical. For example, a spray bottle containing a chemical used during a manufacturing process would be a secondary container.
-) **Stationary** container labels are typically found on large, fixed tanks. These containers cannot be readily moved and may be secured in place.
-) **Portable** containers are used to transfer a chemical from one location to another to be used immediately. Portable containers cannot be used to store chemicals. Portable containers are not required to have a label. For example, a beaker used to transfer a chemical from the secondary container to a workbench for immediate use does not require a label.

HCS Container Labeling

OSHA is allowing a phase-in period for the new HCS 2012. As of December 1st, 2013, all employees should be trained on the new label elements and safety data sheet (SDS) format. Beginning June 1st, 2016, employers should update alternative workplace labeling and the hazard communication program as necessary. They should also provide additional employee training for newly identified physical or health hazards.

During the phase-in period, employers may comply with either the existing HCS 1994, the revised HCS 2012, or both. OSHA recognizes that hazard communication programs will go through a period of time when labels and MSDSs/SDSs under both standards will be present in

the workplace. This will be considered acceptable, and employers are not required to maintain two sets of labels and SDSs for compliance purposes.

Primary Container Labels

The HCS 1994 Primary Container Label Requirements

Most containers shipped directly from the manufacturer or purchased from a distributor are called **shipped or primary containers**. Labeling information on these containers is usually adequate in communicating the hazards of the chemical. Under the old HCS 1994, the chemical manufacturer, importer, or distributor must ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged or marked with the following three elements of information:

-) **identity** of the hazardous chemical(s)
-) **appropriate hazard warnings** (including target organ effects of the hazardous chemical)
-) **name and address** of the chemical manufacturer, importer, or other responsible party

It's important to understand the hazard warning must convey both the particular physical and health hazards of the chemical, including target organ effects. Employees exposed to health hazards must be apprised of both changes in body functions and the signs and symptoms that may occur to signal those changes.

Statements such as "Hazardous if Inhaled," "Caution," or "Danger," are precautionary statements and are **not** to be considered appropriate hazard warnings. If, when inhaled, a chemical causes lung damage, then the appropriate warning is "may cause lung damage."

The HCS 2012 Shipped - Primary Container Label Requirements

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

1. Product Identifier

-) A product identifier means the name or number used for a hazardous product on a label or in the SDS. It provides a unique means by which the product user can identify the substance or mixture within the particular use setting (e.g. transport, consumer or workplace).

-) A product identifier should be used and it should match the product identifier used on the SDS. If the material is a mixture of two or more compounds and it is covered by UN Model regulations for transport of dangerous goods, UN proper shipping name should also appear on package.
-) The label for a substance should include the chemical identity of the substance (name as determined by IUPAC, ISO, CAS or technical name). For mixtures and alloys, the label should include chemical identities of all ingredients or alloying elements that contribute to the following:
 - acute toxicity
 - skin corrosion or serious eye damage
 - germ cell mutagenicity, carcinogenicity, reproductive toxicity, skin or respiratory sensitization, or specific target organ toxicity (STOT)
-) Where a substance or mixture is supplied exclusively for workplace use, a competent authority may choose to give the suppliers discretion to include chemical identities on the SDS, in lieu of including them on labels.
-) The competent authority rules for “Confidential Business Information” (CBI) take priority over the rules for product identification. The meeting criterion for CBI does not have to be included on the label.

2. Signal words

-) Words used to indicate the relative level of severity of hazard. They alert the reader to a potential hazard on the label. Signal words used in GHS are "Danger" and "Warning." “Danger” is for the more severe hazard categories, while “Warning” is used for less severe hazards. Signal words are assigned to each hazard category.

3. Hazard Statements

-) A phrase assigned to a hazard class and category that describes the nature of the hazards of a hazardous product, including, when appropriate, the degree of the hazard. For example, “Fatal if swallowed” could be used as a hazard statement.

-) Hazard statement and code: Hazard statement codes are intended to be used for reference purposes: they are not part of the text and should not be used to replace it.

4. Pictograms

-) Pictogram means a graphical composition that may include a symbol plus other elements, such as a border, background pattern or color that conveys specific information. See the pictograms on the right.



HCS Pictogram and Label Examples

5. Precautionary statements

-) Phrase (and/or pictogram) that describes the recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous product. GHS label should include appropriate precautionary information, the choice of which belongs to the labeler or competent authority.
-) Precautionary codes are used to uniquely identify precautionary statements and are for reference purposes: they are not part of the precautionary text and should not be used to replace it.

6. Supplier identification

-) Name, address, and telephone number of the manufacturer or supplier of the substance or mixture should be provided on the label.

Sample HCS 2012 Primary Container Label

SAMPLE LABEL	
<p style="text-align: center;">PRODUCT IDENTIFIER</p> <p>CODE _____ Product Name _____</p> <p style="text-align: center;">SUPPLIER IDENTIFICATION</p> <p>Company Name _____ Street Address _____ City _____ State _____ Postal Code _____ Country _____ Emergency Phone Number _____</p> <p style="text-align: center;">PRECAUTIONARY STATEMENTS</p> <p>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 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.</p> <p>In Case of Fire: use dry chemical (BC) or Carbon dioxide (CO₂) fire extinguisher to extinguish.</p> <p>First Aid If exposed call Poison Center. If on skin (on hair): Take off immediately any contaminated clothing. Rinse skin with water.</p>	<p style="text-align: center;">HAZARD PICTOGRAMS</p> <p style="text-align: center;"></p> <p style="text-align: center;">SIGNAL WORD Danger</p> <p style="text-align: center;">HAZARD STATEMENT Highly flammable liquid and vapor. May cause liver and kidney damage.</p> <p style="text-align: center;">SUPPLEMENTAL INFORMATION</p> <p>Directions for use _____ _____</p> <p>Fill weight: _____ Lot Number _____</p> <p>Gross weight: _____ Fill Date: _____ Expiration Date: _____</p>

The new GHS (HCS 2012) primary container label above provides much more information than the old HCS 1994 primary container label.

This label is intended to be an immediate visual reminder of the hazards of a chemical. However, it isn't necessary to list every hazard of the chemical on the label. The safety data sheet (SDS) is used for this purpose. Manufacturers, importers, and distributors will have to assess the evidence regarding the product's hazards. They must also consider exposures under normal conditions of use or in foreseeable emergencies when evaluating what hazards are listed on the label. This is not to say that only acute hazards are to be listed on the label, or that well-substantiated hazards should be left off the label because they appear on the data sheet.

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.

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 which, in conjunction with the other information immediately available to employees under the hazard communication program, will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.

Bottom line, the employer must ensure that employees still get all of the hazard information from the elements of the hazard communication program implemented in their workplaces that they would have gotten from a shipping label. To do this, the employer should conduct additional training, discuss SDS information, use signs, process sheets, or other types of warnings to supplement the secondary label information.

Alternative Labeling Methods

Both the HCS 1994 and 2012 recognize and allow the use of alternative in-plant labeling systems such as the HMIS (Hazardous Materials Information System), NFPA (National Fire Protection Association), and others which may be used in industry as long as they convey the required information. These alternative systems use color, numbers and other information to convey the hazards of the chemical.

The key to evaluating the effectiveness of any alternative labeling method is to determine whether employees can correlate the visual warning on the in-plant container with the applicable chemical and its appropriate hazard warnings. The alternative labeling system must also be readily accessible to all employees in their work area throughout each work shift.

For purposes of this provision, the term "other such written materials" does not include safety data sheets used in lieu of labels.

Stationary Process Container Labeling

Stationary process containers are, obviously, stationary. Storage tanks are good examples. The employer may use signs, placards, process sheets, batch tickets, operating procedures, or other written materials in lieu of affixing labels to individual stationary process containers, as long as

the alternative method identifies the containers to which it is applicable and conveys the information required on secondary containers. The written materials must be readily accessible to the employees in their work area throughout each work shift.

Portable Container Labeling

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

The label may be transmitted with the initial shipment itself, or with the material safety data sheet that is to be provided prior to or at the time of the first shipment. This exception to requiring labels on every container of hazardous chemicals is only for the solid material itself, and does not apply to hazardous chemicals used in conjunction with, or known to be present with, the material and to which employees handling the items in transit may be exposed (for example, cutting fluids or pesticides in grains). 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.

If the hazardous chemical is regulated by OSHA in a substance-specific health standard, the chemical manufacturer, importer, distributor, or employer must ensure the labels or other forms of warning used are in accordance with the requirements of that standard.

Other Important Labeling Requirements

Labels are useless unless they accurately communicate the hazards of their associated chemicals. It's important to keep labels in good condition at all times. The employer must not remove or deface existing labels on incoming containers of hazardous chemicals, unless the container is immediately marked with the required information.

The employer must ensure that labels or other forms of warning are:

-) Legible in English
-) prominently displayed on the container
-) readily available in the work area throughout each work shift

Employers having non-English speaking employees may add the information in their native language to the material presented, as long as the information is presented in English as well.

HCS 2012 Pictogram Requirements

As of June 1, 2015, the HCS 2012 will require 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

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

Employees Handling Chemicals in Sealed Containers

In work operations where employees only handle chemicals in sealed containers which are not opened under normal conditions of use (such as are found in marine cargo handling, warehousing, or retail sales), employers must:

-) ensure labels on incoming containers of hazardous chemicals are not removed or defaced
-) maintain copies of any safety data sheets that are received with incoming shipments of the sealed containers of hazardous chemicals
-) obtain a safety data sheet as soon as possible if sealed containers do not have safety data sheets
-) ensure the safety data sheets are readily accessible during each work shift
-) provide appropriate information and training about the hazards of the chemicals employees use
-) protect employees in the event of a spill or leak of a hazardous chemical from a sealed container

Module 2 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

- 1. Under the new HCS 2012 guidelines, _____ labels are found on manufacturing or shipping containers.**
 - a. secondary
 - b. primary
 - c. stationary
 - d. portable

- 2. Under the new HCS 2012 guidelines, when do employers need to start updating alternative workplace labeling and hazard communication programs and provide additional employee training?**
 - a. Beginning August 1, 2016
 - b. Beginning June 1, 2016
 - c. Beginning January 1, 2015
 - d. Beginning December 1, 2015

- 3. Labels on primary containers will need to be labeled, tagged or marked with _____.**
 - a. signal words
 - b. hazard statements
 - c. pictograms
 - d. all of the above

- 4. A _____ means the name or number used for a hazardous product on a label or in the SDS.**
 - a. product identifier
 - b. hazard statement
 - c. precautionary statements
 - d. supplier identification

5. This type of pictogram is used for _____.

- a. explosives
- b. flammables
- c. acute toxicity
- d. oxidizers



Module 3: Safety Data Sheets

What's a Safety Data Sheet (SDS)?

The safety data sheet (SDS) is used to communicate chemical hazard information from the manufacturer to the employee. This is the information needed to inform and train employees on the safe use of hazardous chemicals. The employer is required to have an SDS for each hazardous chemical product they use. This module will examine the SDS and the requirements for maintaining an effective SDS system. So, let's get going.

Who must have them?

-) Chemical manufacturers and importers must obtain or develop a SDS for each hazardous chemical they **produce** or **import**. Employers that mix chemicals that result in an interaction may be considered to be manufacturers and required to develop a SDS for the new chemical. If the chemicals in the mixture do not interact, the employer may be able to use the existing SDSs for each chemical in the mixture. Check with OSHA if you have questions about mixing chemicals in your workplace.
-) Employers must have a SDS in the workplace for each hazardous chemical which they use.

The SDS Form

Let's take a look at the SDS form, itself. Some of the terms in each section link to additional information. You can check out the "Glossary" tab on the course home page for general information on terms you may not be familiar with. I'll detail important points related to each SDS section and then show you an example that illustrates those points. So, let's start the review.

The chemical manufacturer or importer preparing the safety data sheet must ensure that it is in English (although the employer may maintain copies in other languages as well).

The SDS must include the information as specified in 1910.1200, Appendix D, Table D.1 under the section number and heading indicated for sections 1-11 and 16. If no relevant information is found for any given subheading within a section, the SDS shall clearly indicate that no applicable information is available. Sections 12-15 may be included in the SDS, but are not mandatory. **Note: Not all sections are mandatory: only sections 1-11 and 16**. Remember that because it's on the exam!

Let's review each of the 16 sections in the sample SDS in the next few sections:

Sample GHS Safety Data Sheet

1. Identification

Product Name: Chemical Stuff

Synonyms: Methyltoxy Solution

CAS Number: 000-00-0

Product Use: Organic Synthesis

Manufacturer/Supplier: My Company

Address: Any Street, Mytown, TX 00000

General Information: 555-123-4567

Transportation Emergency Number: CHEMTREC: 800-424-9300

2. Hazards Identification

GHS Classification

Health	Environmental	Physical
<p>Acute Toxicity - Category 2 (inhalation), Category 3 (oral/dermal)</p> <p>Eye Corrosion - Category 1</p> <p>Skin Corrosion - Category 1</p> <p>Skin Sensitization - Category 1</p> <p>Mutagenicity - Category 2</p> <p>Carcinogenicity - Category 1B</p> <p>Reproductive/Developmental - Category 2</p> <p>Target Organ Toxicity (Repeated) - Category 2</p>	<p>Aquatic Toxicity - Acute 2</p>	<p>Flammable Liquid - Category 2</p>

Click [here](#) for an explanation of the hazard categories for GHS identification and labeling.

GHS Label

Symbols: flame, skull and crossbones, corrosion, health hazard

Hazard Statements	Precautionary Statements
<p>DANGER!</p> <p>Highly Flammable Liquid and Vapor.</p> <p>Fatal if inhaled.</p> <p>Causes severe skin burns and eye damage.</p> <p>May cause allergic skin reaction.</p> <p>Toxic if swallowed and in contact with skin</p> <p>May cause cancer.</p> <p>Suspected of damaging the unborn child.</p> <p>Suspected of causing genetic defects.</p> <p>May cause damage to cardiovascular, respiratory, nervous, and gastrointestinal systems and liver and blood through prolonged or repeated exposure.</p> <p>Toxic to aquatic life.</p>	<p>Do not eat, drink or use tobacco when using this product.</p> <p>Do not breathe mist/vapors.</p> <p>Keep container tightly closed.</p> <p>Keep away from heat/sparks/open flame. - No smoking.</p> <p>Wear respiratory protection, protective gloves and eye/face protection.</p> <p>Use only in a well-ventilated area.</p> <p>Take precautionary measures against static discharge.</p> <p>Use only non-sparking tools.</p> <p>Store container tightly closed in cool/well-ventilated place.</p> <p>Wash thoroughly after handling.</p>

3. Composition / Information on Ingredients

Component	CAS Number	Weight %
Methyltoxy	000-00-0	80

(See Section 8 for Exposure Limits)

4. First Aid Measures

Eye: Eye irritation. Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get immediate medical attention.

Skin: Itching or burning of the skin. Immediately flush the skin with plenty of water while removing contaminated clothing and shoes. Get immediate medical attention. Wash contaminated clothing before reuse.

Inhalation: Nasal irritation, headache, dizziness, nausea, vomiting, heart palpitations, breathing difficulty, cyanosis, tremors, weakness, red flushing of face, irritability. Remove exposed person

from source of exposure to fresh air. If not breathing, clear airway and start cardiopulmonary resuscitation (CPR). Avoid mouth-to-mouth resuscitation.

Ingestion: Get immediate medical attention. Do not induce vomiting unless directed by medical personnel.

5. Firefighting Measures

Suitable Extinguishing Media: Use dry chemical, foam, or carbon dioxide to extinguish fire. Water may be ineffective but should be used to cool fire-exposed containers, structures and to protect personnel. Use water to dilute spills and to flush them away from sources of ignition.

Firefighting Procedures: Do not flush down sewers or other drainage systems. Each exposed firefighter must wear a NIOSH-approved positive pressure self-contained breathing apparatus with full-face mask and full protective clothing.

Unusual Fire and Explosion Hazards: Dangerous when exposed to heat or flame. Will form flammable or explosive mixtures with air at room temperature. Vapor or gas may spread to distant ignition sources and flash back. Vapors or gas may accumulate in low areas. Runoff to sewer may cause fire or explosion hazard. Containers may explode in heat of fire. Vapors may concentrate in confined areas. Liquid will float and may reignite on the surface of water.

Combustion Products: Irritating or toxic substances may be emitted upon thermal

6. Accidental Release Measures

Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind; keep out of low areas. (Also see Section 8).

Vapor protective clothing should be worn for spills and leaks. Shut off ignition sources; no flares, smoking or flames in hazard area. Small spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal. Large spills: Dike far ahead of liquid spill for later disposal.

Do not flush to sewer or waterways. Prevent release to the environment if possible. Refer to Section 15 for spill/release reporting information.

7. Handling and Storage

Handling - Do not get in eyes, on skin or on clothing. Do not breathe vapors or mists. Keep container closed. Use only with adequate ventilation. Use good personal hygiene practices. Wash hands before eating, drinking, smoking. Remove contaminated clothing and clean before

re-use. Destroy contaminated belts and shoes and other items that cannot be decontaminated.

Keep away from heat and flame. Keep operating temperatures below ignition temperatures at all times. Use non-sparking tools.

Storage - Store in tightly closed containers in cool, dry, well-ventilated area away from heat, sources of ignition and incompatibles. Ground lines and equipment used during transfer to reduce the possibility of static spark-initiated fire or explosion. Store at ambient or lower temperature. Store out of direct sunlight. Keep containers tightly closed and upright when not in use. Protect against physical damage.

Empty containers may contain toxic, flammable and explosive residue or vapors. Do not cut, grind, drill, or weld on or near containers unless precautions are taken against these hazards.

8. Exposure Controls / Personal Protection

Exposure Limits

Component, Methyltoxy - **TWA**: 3 ppm (skin) - **STEL**: C 15 ppm (15 min.)

Engineering Controls: Local exhaust ventilation may be necessary to control air contaminants to their exposure limits. The use of local ventilation is recommended to control emissions near the source. Provide mechanical ventilation for confined spaces. Use explosion-proof ventilation equipment.

Personal Protective Equipment (PPE)

Eye Protection: Wear chemical safety goggles and face shield. Have eye-wash stations available where eye contact can occur.

Skin Protection: Avoid skin contact. Wear gloves impervious to conditions of use. Additional protection may be necessary to prevent skin contact including use of apron, face shield, boots or full body protection. A safety shower should be located in the work area. Recommended protective materials include: Butyl rubber and, for limited contact, Teflon.

Respiratory Protection: If exposure limits are exceeded, NIOSH approved respiratory protection should be worn. A NIOSH approved respirator for organic vapors is generally acceptable for concentrations up to 10 times the PEL. For higher concentrations, unknown concentrations and for oxygen deficient atmospheres, use a NIOSH approved air-supplied respirator. Engineering controls are the preferred means for controlling chemical exposures. Respiratory protection may be needed for non-routine or emergency situations. Respiratory protection must be provided in accordance with OSHA 29 CFR 1910.134.

9. Physical and Chemical Properties

Flashpoint: 2°C (35°F)

Autoignition Temperature: 480°C (896°F)

Boiling Point: 77°C (170.6°F) @ 760 mm Hg

Melting Point: -82°C

Vapor Pressure: 100.0 mm Hg @ 23°C

Vapor Density: 1.7; (Air = 1)

% Solubility in Water: 10 @ 20 deg C

Pour Point: NA

Molecular Formula: Mixture

Odor/Appearance: Clear, colorless liquid with mild, pungent odor.

Lower Flammability Limit: >3.00%

Upper Flammability Limit: <15.00%

Specific Gravity: 0.82g/ml @ 20°C

% Volatile: 100

Evaporation Rate (Water=1): 5(Butyl Acetate =1)

Viscosity: 0.3 cP @ 25°C

Octanol/Water Partition Coefficient: log K_{ow} : 0.5

pH: 7, 8% aqueous solution

Molecular Weight: Mixture

10. Stability and Reactivity

Stability/Incompatibility: Incompatible with ammonia, amines, bromine, strong bases and strong acids.

Hazardous Reactions/Decomposition Products: Thermal decomposition products may include oxides of carbon and nitrogen.

11. Toxicological Information

Signs and Symptoms of Overexposure: Eye and nasal irritation, headache, dizziness, nausea, vomiting, heart palpitations, difficulty breathing, cyanosis, tremors, weakness, itching or burning of the skin.

Acute Effects:

Eye Contact: may cause severe conjunctival irritation and corneal damage.

Skin Contact: may cause reddening, blistering or burns with permanent damage. Harmful if absorbed through the skin. May cause allergic skin reaction.

Inhalation: may cause severe irritation with possible lung damage (pulmonary edema).

Ingestion: may cause severe gastrointestinal burns.

Target Organ Effects: May cause gastrointestinal (oral), respiratory tract, nervous system and blood effects based on experimental animal data. May cause cardiovascular system and liver effects.

Chronic Effects: based on experimental animal data, may cause changes to genetic material; adverse effects on the developing fetus or on reproduction at doses that were toxic to the mother. Methyltoxy is classified by IARC as group 2B and by NTP as reasonably anticipated to be a human carcinogen. OSHA regulates Methyltoxy as a potential carcinogen.

Medical Conditions Aggravated by Exposure: preexisting diseases of the respiratory tract, nervous system, cardiovascular system, liver or gastrointestinal tract.

Acute Toxicity Values

Oral LD₅₀ (Rat) = 100 mg/kg

Dermal LD₅₀ (Rabbit) = 225-300 mg/kg

Inhalation LC₅₀ (Rat) = 200 ppm/4 hr., 1100 ppm vapor/1 hr

12. Ecological Information

LC₅₀ (Fathead Minnows) = 9 mg/L/96 hr.

EC₅₀ (Daphnia) = 8.6 mg/L/48 hr.

Bioaccumulation is not expected to be significant. This product is readily biodegradable.

13. Disposal Considerations

As sold, this product, when discarded or disposed of, is a hazardous waste according to Federal regulations (40 CFR 261). It is listed as Hazardous Waste Number Z000, listed due to its toxicity. The transportation, storage, treatment and disposal of this waste material must be conducted in compliance with 40 CFR 262, 263, 264, 268 and 270. Disposal can occur only in properly permitted facilities. Refer to state and local requirements for any additional requirements, as these may be different from Federal laws and regulations. Chemical additions, processing or otherwise altering this material may make waste management information presented in the SDS incomplete, inaccurate or otherwise inappropriate.

14. Transport Information

U.S. Department of Transportation (DOT)

Proper Shipping Name: Methyltoxy

Hazard Class: 3, 6.1

UN/NA Number: UN0000

Packing Group: PG 2

Labels Required: Flammable Liquid and Toxic

International Maritime Organization (IMDG)

Proper Shipping Name: Methyltoxy

Hazard Class: 3 Subsidiary 6.1

UN/NA Number: UN0000

Packing Group: PG 2

Labels Required: Flammable Liquid and Toxic

15. Regulatory Information

U.S. Federal Regulations

Comprehensive Environmental Response and Liability Act of 1980 (CERCLA):

The reportable quantity (RQ) for this material is 1000 pounds. If appropriate, immediately report to the National Response Center (800/424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies.

Toxic Substances Control Act (TSCA): All components of this product are included on the TSCA inventory.

Clean Water Act (CWA): Methyltoxy is a hazardous substance under the Clean Water Act. Consult Federal, State and local regulations for specific requirements.

Clean Air Act (CAA): Methyltoxy is a hazardous substance under the Clean Air Act. Consult Federal, State and local regulations for specific requirements.

Superfund Amendments and Reauthorization Act (SARA) Title III Information:

SARA Section 311/312 (40 CFR 370) Hazard Categories:

Immediate Hazard: X

Delayed Hazard: X

Fire Hazard: X

Pressure Hazard:

Reactivity Hazard:

This product contains the following toxic chemical(s) subject to reporting requirements of SARA Section 313 (40 CFR 372)

Component	CAS Number	Maximum %
Methyltoxy	000-00-0	80

State Regulations

California: This product contains the following chemicals(s) known to the State of California to cause cancer, birth defects or reproductive harm:

Component	CAS Number	Maximum %
Methyltoxy	000-00-0	80

International Regulations

Canadian Environmental Protection Act: All of the components of this product are included on the Canadian Domestic Substances list (DSL).

Canadian Workplace Hazardous Materials Information System (WHMIS):

Class B-2 Flammable Liquid

Class D-1-B Toxic

Class D-2-A Carcinogen

Class D-2-B Chronic Toxin

Class E Corrosive

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

European Inventory of Existing Chemicals (EINECS): All of the components of this product are included on EINECS.

EU Classification: F Highly Flammable; T Toxic; N Dangerous to the Environment
EU Risk (R) and Safety (S)

Phrases:

R11: Highly flammable.

R23/24/25: Toxic by inhalation, in contact with skin and if swallowed.

R37/38: Irritating to respiratory system and skin.

R41: Risk of serious damage to eyes.

R43: May cause sensitization by skin contact.

R45: May cause cancer.

R51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S53: Avoid exposure - obtain special instructions before use.

S16: Keep away from sources of ignition - No Smoking.

S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S9: Keep container in a well-ventilated place.

S36/37: Wear suitable protective clothing and gloves.

S57: Use appropriate container to avoid environmental contamination.

16. Other Information

National Fire Protection Association (NFPA) Ratings: This information is intended solely for the use of individuals trained in the NFPA system.

Health: 3

Flammability: 3

Reactivity: 0

Revision Indicator: New SDS

Disclaimer: The information contained herein is accurate to the best of our knowledge. ABC Inc. makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances.

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 the SDSs to the distributor or employer prior to or at the time of the shipment.
-) Ensure that SDSs, and updated information, are **provided to other distributors and employers with their initial shipment** and with the first shipment after a SDS is updated;

- J Provide SDSs with the shipped containers, or send them to the other distributor or employer prior to or at the time of the shipment;
- J Retail distributors selling hazardous chemicals to employers having a commercial account must:
 - o provide a SDS to such employers upon request, and
 - o post a sign or otherwise inform them that a SDS is available.
- J If an employer without a commercial account purchases a hazardous chemical from a retail distributor not required to have SDSs on file (i.e., the retail distributor does not have commercial accounts and does not use the materials), the retail distributor must provide the employer, upon request, with the name, address, and telephone number of the chemical manufacturer, importer, or distributor from which a SDS can be obtained.
- J Chemical manufacturers, importers, and distributors need not provide SDSs to retail distributors that have informed them that the retail distributor does not sell the product to commercial accounts or open the sealed container to use it in their own workplaces.
- J Wholesale distributors selling hazardous chemicals to employers over-the-counter must:
 - o provide a SDS upon the request of the employer at the time of the over-the-counter purchase, and
 - o post a sign or otherwise inform such employers that a SDS is available.

Employer Responsibilities

- J **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.
- J **Employers must maintain copies of the required SDSs in their workplace** for each hazardous chemical, and must ensure that SDS are readily accessible during each work shift to employees when they are in their work area(s).
- J Electronic access and other alternatives to maintaining paper copies of the SDS are permitted as long as 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 workshift, 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, as long as the employer has a representative available at all times to ensure **ready access** (within a few minutes) to this information. This is the only situation in which an employer is allowed to 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.

Well, I hope you understand the SDS and the various requirements related to its management. As usual, read the rules and ask an OSHA consultant if you have specific questions about SDS management at your workplace. Here's [another example](#) of an SDS for your review. Now it's time for the quiz, so let's go.

Module 3 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

- 1. The _____ must conduct valid research and assess the hazards of the chemicals they produce.**
 - a. manufacturer
 - b. distributor
 - c. employer
 - d. employee

- 2. What language are chemical manufacturers and/or importers required to provide the SDS in?**
 - a. English
 - b. The language of the importer
 - c. The language of the chemical manufacturer
 - d. Any language

- 3. Wholesale distributors selling hazardous chemicals to employers over-the-counter must _____.**
 - a. upload SDS information to computer files when the manufacturer requests it
 - b. provide a SDS upon the request of the employer at the time of purchase
 - c. develop a SDS within 24 hours of the request of any third-party employee
 - d. provide a quarterly update of all hazardous chemicals being sold

- 4. When employees must travel between workplaces during a work shift, the safety data sheets _____.**
 - a. may be kept anywhere
 - b. must be in the cab of the truck
 - c. may be kept at the primary workplace facility
 - d. must be filed in a computer

5. Safety data sheets may be kept in any form, including operating procedures.

- a. True
- b. False

Module 4: Employee Training

Introduction

Each employee who may be “exposed” to hazardous chemicals when working must be provided information and be trained prior to initial assignment working with a hazardous chemical as well as whenever the hazard changes.

“Exposure” or “exposed” under the rule means an employee is subjected to a hazardous chemical in the course of employment through any route of entry (inhalation, ingestion, skin contact, or absorption) and includes potential (e.g., accidental or possible) exposure.

Information and training may be done either by individual chemical or by categories of hazards (such as flammability or carcinogenicity). If there are only a few chemicals in the workplace, then you may want to discuss each one individually. Where there are a large number of chemicals, or the chemicals change frequently, you will probably want to train generally based on the hazard categories (e.g., flammable liquids, corrosive materials, carcinogens). Employees will also have access to the substance-specific information on the labels and MSDSs. Employers must ensure, however, that employees are made aware of which hazard category a chemical falls within.

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)

In addition, employees must know the following:

-) contents of the occupational exposure standard and its appendices

- J The location and availability of the employer's chemical hygiene plan Potential Exposure Limits (PELs).
- J The PELs for the hazardous substances to which employees are exposed.
- J The signs and symptoms associated with exposures to hazardous chemicals used in the workplace.
- J The location and availability of known reference material on the chemical hazards, and their safe handling, storage, and disposal including, but not limited to, Material Safety Data Sheets (MSDSs) received from chemical suppliers.

Employee training must include at least:

- J The methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.).
- J 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.

Note: Training need not be conducted on each specific chemical found in the workplace, but may be conducted by categories of hazard (e.g., carcinogens, sensitizers, acutely toxic agents) that are or may be encountered by an employee during the course of his duties.

- J 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.
- J The details of the hazard communication program developed by the employer, including 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.

For more information on creating a workplace HAZCOM program, see OSHAcademy course [705 Hazard Communications Program](#).

Remember, an employer has a responsibility to evaluate an employee's level of knowledge with regard to the hazards in the workplace, their familiarity with the requirements of the standard, and the employer's hazard communication program.

Scenario

In 2012, a 37-year-old female technician employed by a surface-refinishing business died from inhalation exposure to methylene chloride and methanol vapors while she used a chemical stripper to prep the surface of a bathtub for refinishing. The technician was working alone without respiratory protection or ventilation controls in a small bathroom of a rental apartment.

When the technician did not pick up her children at the end of the day, her parents contacted her employer, who then called the apartment complex manager after determining the victim's personal vehicle was still at the refinishing company's parking lot. The apartment complex manager went to the apartment unit where the employee had been working and called 911 upon finding the employee unresponsive, slumped over the bathtub.

The apartment manager and first responders reported a strong chemical odor in the second story apartment. There was an uncapped gallon can of Klean Strip Aircraft® Low Odor Paint Remover (80-90% methylene chloride, 5-10% methanol) in the bathroom. The employee's tools and knee pad were found in the tub, suggesting the employee had been kneeling and leaning over the tub wall to manually remove the loosened original bathtub finish coat.

The factors contributing to this lethal exposure include use of a highly concentrated methylene chloride chemical stripper having poor warning properties ("Low Odor"); working in a small room without local exhaust ventilation to remove chemical vapors or provide fresh air; and working without a respirator that could have protected the employee from exposure.

The following recommendations are made to prevent future occurrences:

1. Provide all employees with training regarding the hazardous substances in their work area at the time of initial assignment and when new chemical hazards are introduced, in accordance with OSHA's hazard communication standard.
2. Substitute less hazardous products or methods to remove tub or sink surfaces that do not involve methylene chloride compounds.
3. If using methylene chloride based products, adhere to requirements of OSHA's methylene chloride standard regarding hazard communication, regulated areas, exposure monitoring, medical surveillance, and exposure control methods to maintain exposures below the Action Level.

Module 4 Quiz

Use this quiz to self-check your understanding of the module content. You can also go online and take this quiz within the module. The online quiz provides the correct answer once submitted.

- 1. Each employee who may be “exposed” to hazardous chemicals at work must be trained _____ to initial assignment.**
 - a. during
 - b. prior
 - c. after
 - d. a month before

- 2. Exposure under the rule means an employee is subjected to a hazardous chemical through any route of entry.**
 - a. True
 - b. False

- 3. An employer has a _____ to evaluate an employee’s level of knowledge with regard to hazards in the workplace.**
 - a. requirement
 - b. responsibility
 - c. right
 - d. knowledge

- 4. Employees must be informed of _____.**
 - a. requirements of the HCS 2012
 - b. any operations in their work area where hazardous chemicals are present
 - c. location of the employer’s chemical hygiene plan
 - d. all of the above

- 5. Employers should not provide training for individual chemicals. The training must only be done by categories of hazards.**
 - a. True
 - b. False