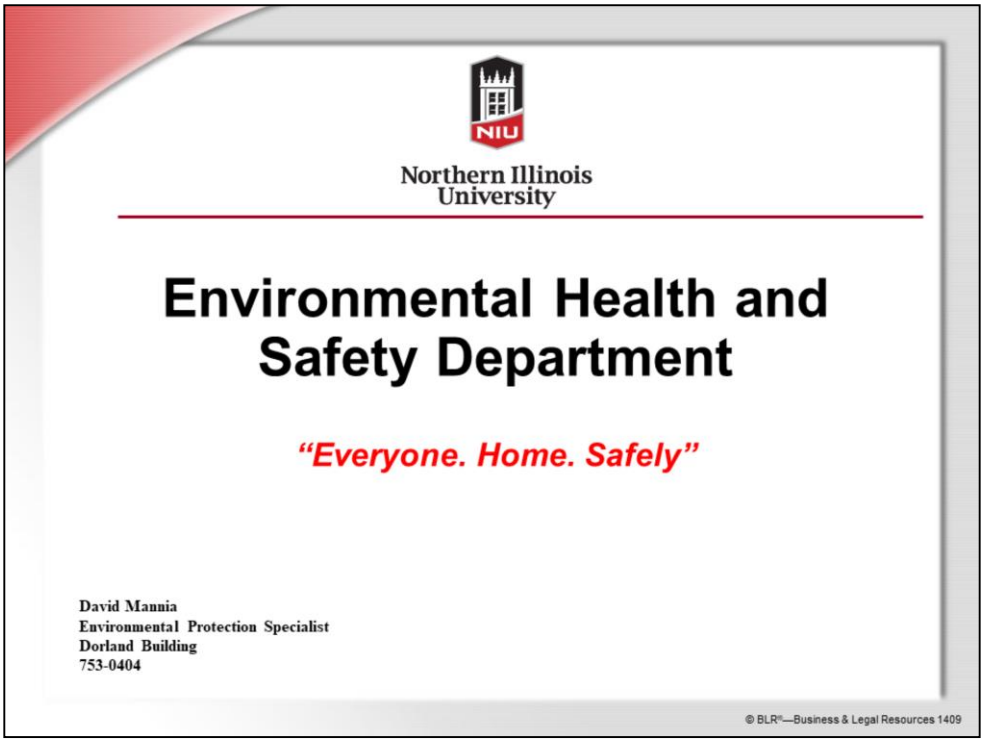


Welcome to Northern Illinois University's Hazard Communication Training presentation.

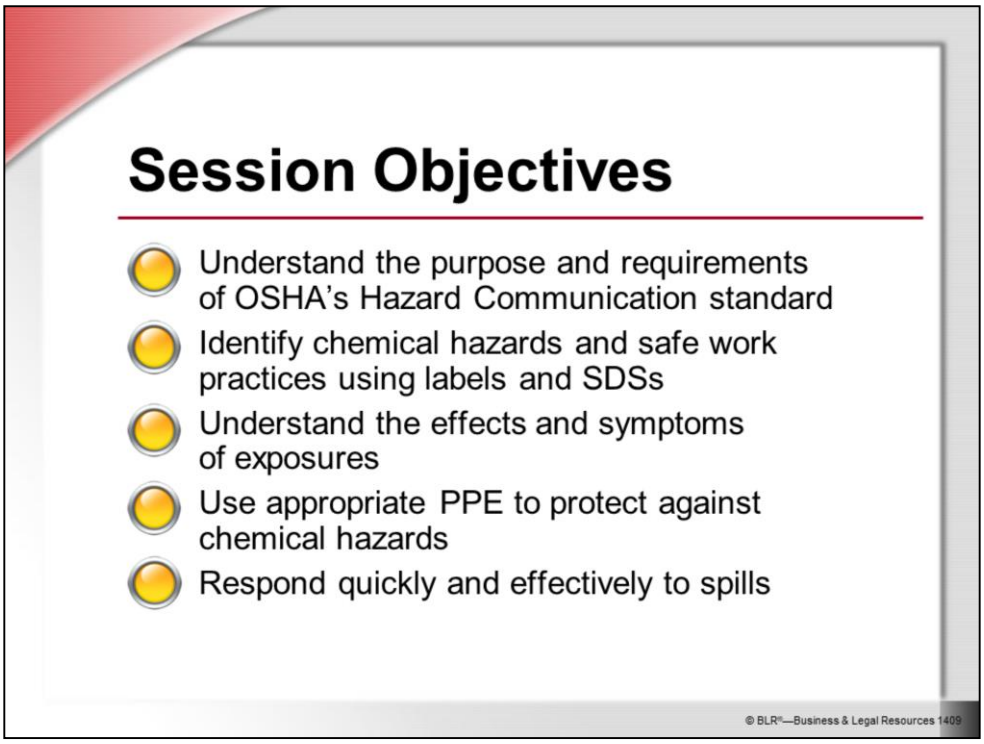
Motto of EHS is "Everyone. Home. Safely." Which is also the purpose of the Hazard Communication Standard. To keep **you** safe while working with hazardous materials.

OSHA's Hazard Communication standard mandates that employees have a right-to-know of the associated health and safety hazards of chemicals being used at work. The standard requires us to make sure you understand the steps you can take to protect yourself from chemical hazards in the workplace.

Hazard Communication training consists of two parts: general and work-specific.

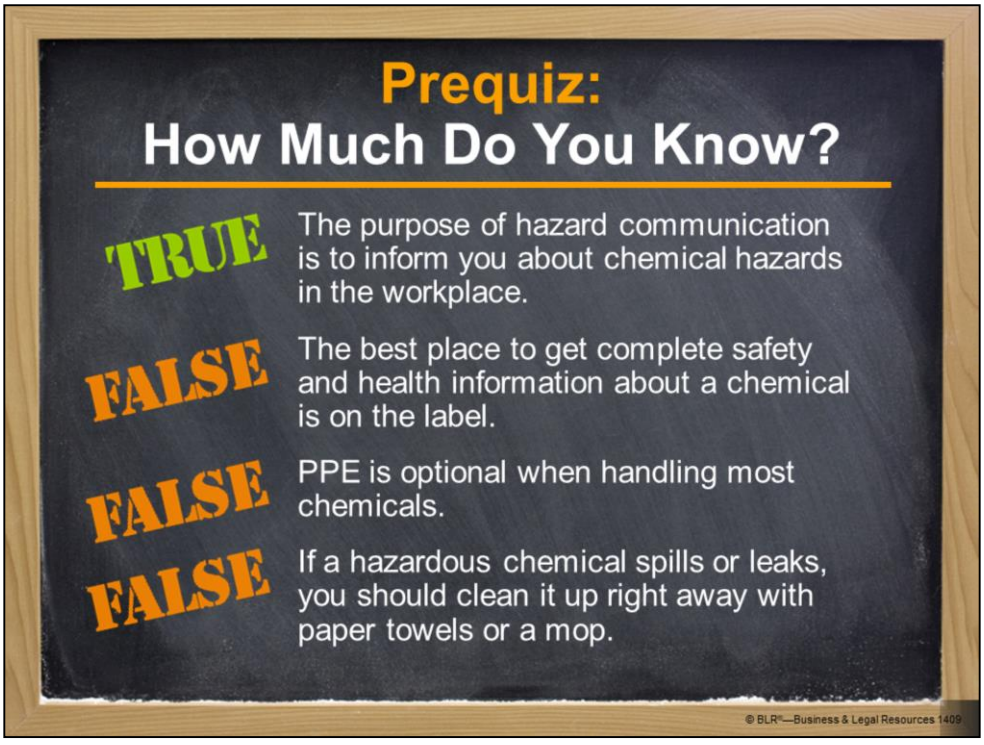
EHS provides the general training, which consists of the requirements of 29 CFR 1910.1200, how to read and interpret a SDS, and the elements of the Globally Harmonized System of classification and labeling.

The work-specific training is provided by your department and includes the location of the chemical inventory and associated SDSs, the proper use of PPE, and the emergency procedures to follow if an employee is exposed to a chemical.



The main objective of this session is to make sure you can identify chemical hazards and take proper precautions to protect your health and safety whenever you work with or around hazardous chemicals. After this session is over, you should be able to:

- Understand the purpose and requirements of OSHA's Hazard Communication standard;
- Identify chemical hazards and safe work practices using labels and safety data sheets, or SDSs;
- Understand the effects and symptoms of exposures and proper first aid;
- Use appropriate personal protective equipment, or PPE, to protect against specific hazards; *and*
- Respond quickly and effectively to spills.



Before we begin the session, let's see how much you already know about hazard communication. Decide which of the statements on the screen are **True** *or* **False.**

- The purpose of hazard communication is to inform you about chemical hazards in the workplace.
  - This is **true.**
- The best place to get complete safety and health information about a chemical is on the label.
  - This is **false.** ***(SDS sheets)***
- PPE is optional when handling most chemicals.
  - This is also **false.** ***(Must always be*** *used)*
- If a hazardous chemical spills or leaks, you should clean it up right away with paper towels or a mop.
  - This is also **false.** ***(Example: using clay absorbent to clean up an oxidizer)***

- OSHA's Hazard Communication standard says that you have the right to know about chemical hazards in the workplace **and** how to work safely with hazardous chemicals.

The goal is to prevent accidents and injuries by making employees aware of the hazardous chemicals in the workplace **and** how to handle those chemicals safely.

If you feel unsafe or even uncomfortable about working with a chemical you are encouraged to stop work and discuss your concerns with either your supervisor or the EHS Department.

The Hazard Communication standard requires **manufacturers** to provide information about the hazards of their chemicals to help users handle them safely.

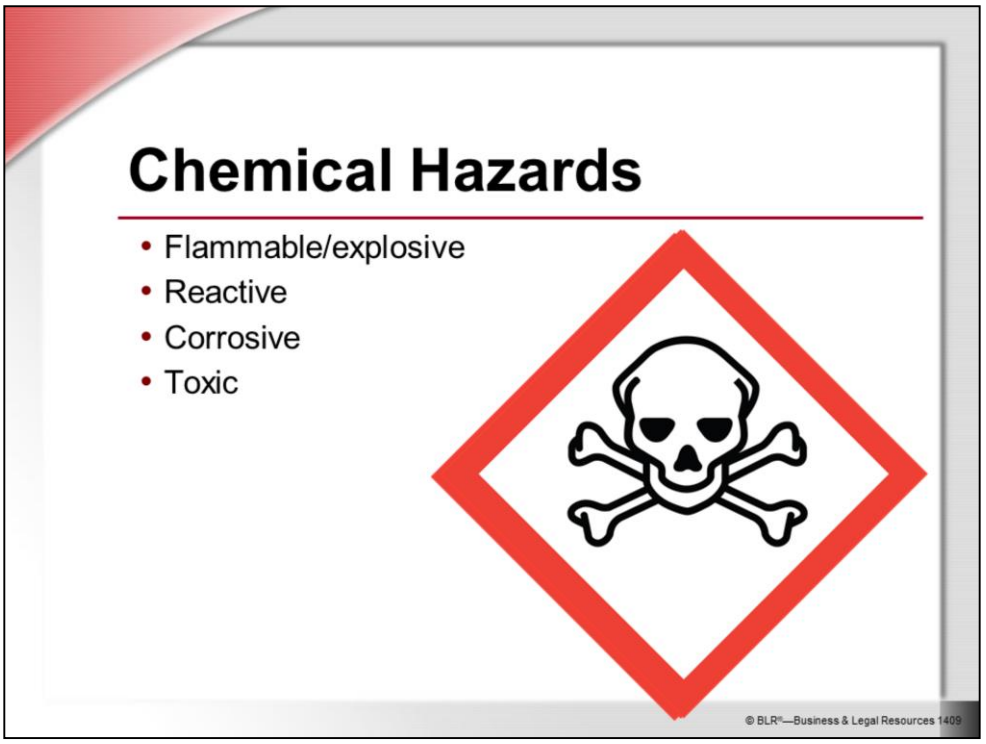
The standard requires manufacturers to do three important things.

- First, they must determine what all the health and safety hazards are.
- Next, they must label their containers with this information.
- And finally, they must develop an SDS that contains detailed information about their chemical. Manufacturers must provide an SDS to anyone who purchases the chemical directly from them, as well as to anyone who requests a copy of the SDS.

Employers have four basic duties under the Hazard Communication standard.

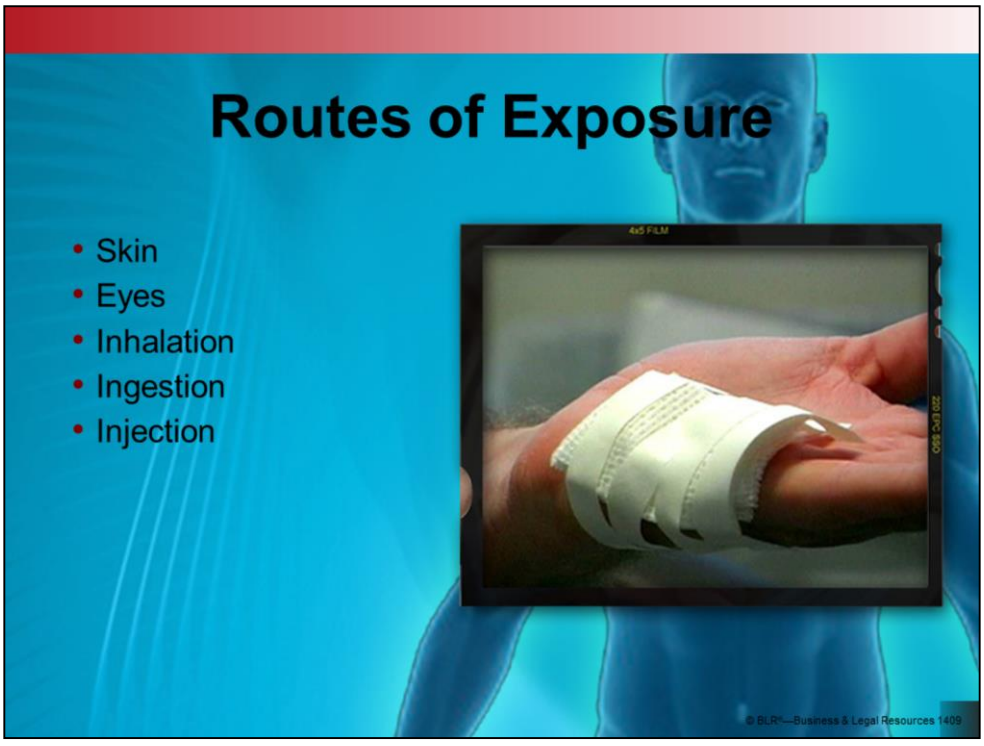
- First, we are required to have a written hazard communication program that describes how we intend to ensure that all employees understand the hazards of chemicals in the workplace.
- Second, we must maintain a list of hazardous chemicals that are used and stored in the workplace.
- Third, we must obtain SDSs from manufacturers, and maintain them in such a way that you and your coworkers have unrestricted access to them at any time.
- Fourth, we are required to train you to make sure you understand chemical hazards and safe work practices. Training must include information about OSHA's Hazard Communication standard, about specific chemicals in the workplace, about how to read and interpret labels, and how to obtain and read SDSs.

Are you familiar with our hazard communication program? Where is the written plan located? Where are your SDS sheets located?



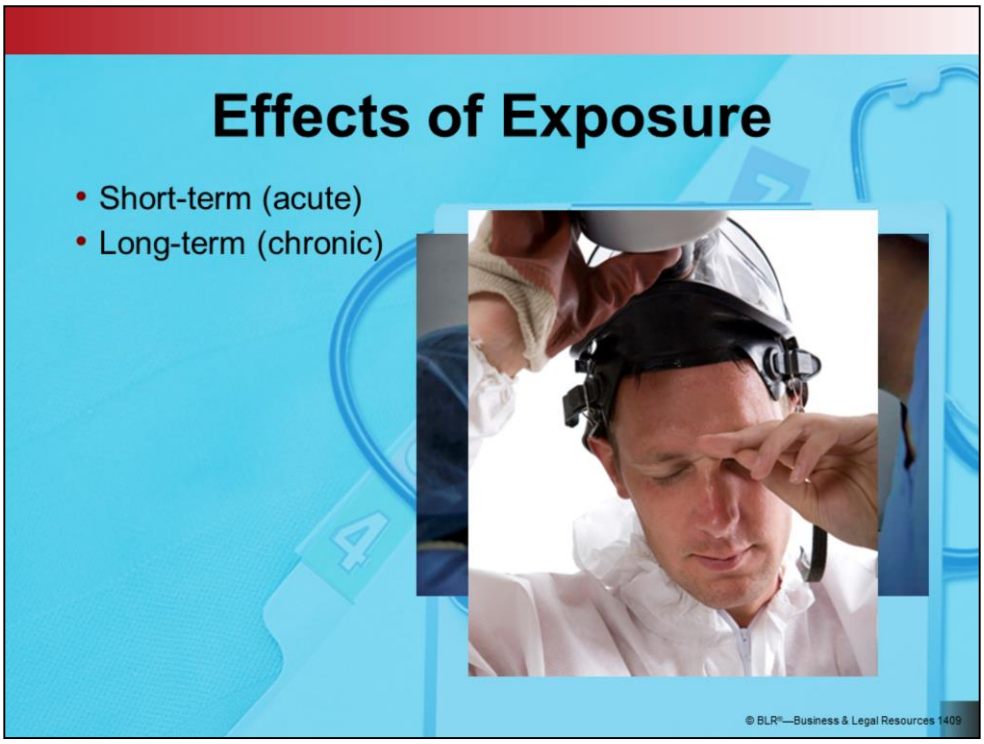
Chemical hazards fall into four categories. A chemical may have only one of these hazard characteristics **or** all four.

- Chemicals that are flammable or explosive are easily ignited by a flame or spark. Examples include propane, gasoline, acetone, and alcohol.
- Reactive chemicals will burn, explode, or release gases after making contact with water, air, or other chemicals. Examples include acetylene, chlorine, and nitric acid.
- Corrosive chemicals will eat through metals, clothing, and human skin. Corrosive materials might be acids or alkalines. Alkalines are also known as caustics or bases. Examples of corrosive materials include sulfuric acid, caustic soda, and sodium hydroxide.
- Toxic chemicals which are any substances that may be harmful to your health if inhaled, ingested or absorbed through the skin. Examples of toxic chemicals include pesticides, solvents, and asbestos.



Recognizing possible ways you could be exposed to hazardous chemicals will help you take the right precautions to protect your health.

- Chemicals can get **on your skin** and cause irritation such as a rash. They can also burn your skin. Some toxic chemicals can be absorbed through the skin, get into your blood stream, and affect target organs.
- If chemicals get **in your eyes**, they will likely cause irritation. Some could even cause serious eye damage that could affect your vision.
- If you **breathe** chemical vapors, gases, dust, or fumes, these contaminants can get into your respiratory system and cause irritation and damage. In high concentrations some chemicals can even prevent you from getting enough oxygen.
- Chemicals can also be swallowed, or **ingested**, when they get on food or into beverages that are later consumed. They can also be swallowed if you touch your mouth with contaminated hands.
- Chemicals can also enter your body by being **injected** under your skin by a sharp object such as a metal edge on a drum lid, a blade, a screwdriver, or a needle.



The health effects of exposure to hazardous chemicals can be short-term or long-term.

- Short-term effects, called “acute” effects, are typically the result of a brief exposure that occurs once or a few times over a short period. Acute effects generally occur soon after exposure **and** disappear over time once you are no longer exposed to the chemical. Symptoms of a brief exposure might include a rash, dizziness, a headache, or eye irritation.

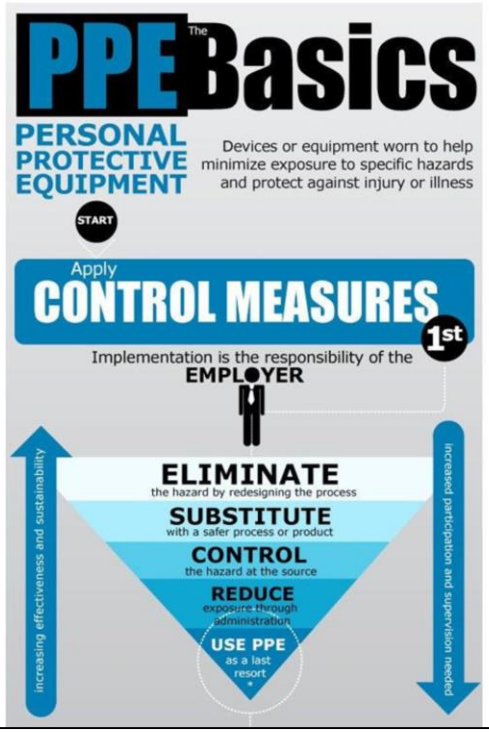
- Chronic, or long-term effects, are typically the result of being exposed to a chemical over a period of many years, are usually permanent **and** will not disappear even after you are no longer exposed to the chemical. Chronic illnesses can also occur after brief exposures to extremely high concentrations of some chemicals. Chronic illnesses include sensitization, lung and liver damage, and cancer.

Effects of Exposure (cont.)

Preventive measures include:

The concentration and duration of the exposure will often determine how you are affected. Safe exposure limits for many chemicals are set by OSHA and are called the permissible exposure limit, or PEL. Safe concentrations may also be referred to as the threshold limit value, or TLV. Both the TLV and PEL can be found in the SDS. They refer to concentrations of a chemical that the average employee can safely be exposed to during an 8-hour workday.

PELs are legal limits, meaning OSHA can enforce their use and any non-compliance. TLVs are recommendations and not legal limits.



The goal is to keep the concentration level of chemicals in the air below the PEL and TLV to protect you from overexposure.

We use a variety of preventive measures to do this, including:

- **Eliminate** the hazard through engineering controls, such as ventilation or **substitution**;
- **Reduce** exposure through administrative controls, such as limiting the amount of time you can work with certain chemicals or the area where these chemicals are being used; *and*
- As a last resort, **PPE**, such as respirators, gloves, and goggles.

PPE is a very important part of exposure prevention. Sometimes, engineering and administrative controls **alone** aren't enough to prevent exposures. That's where PPE comes in. It's **your** personal barrier against chemical hazards. The type of PPE required depends on the potential exposure. The SDS will identify the right PPE for you.

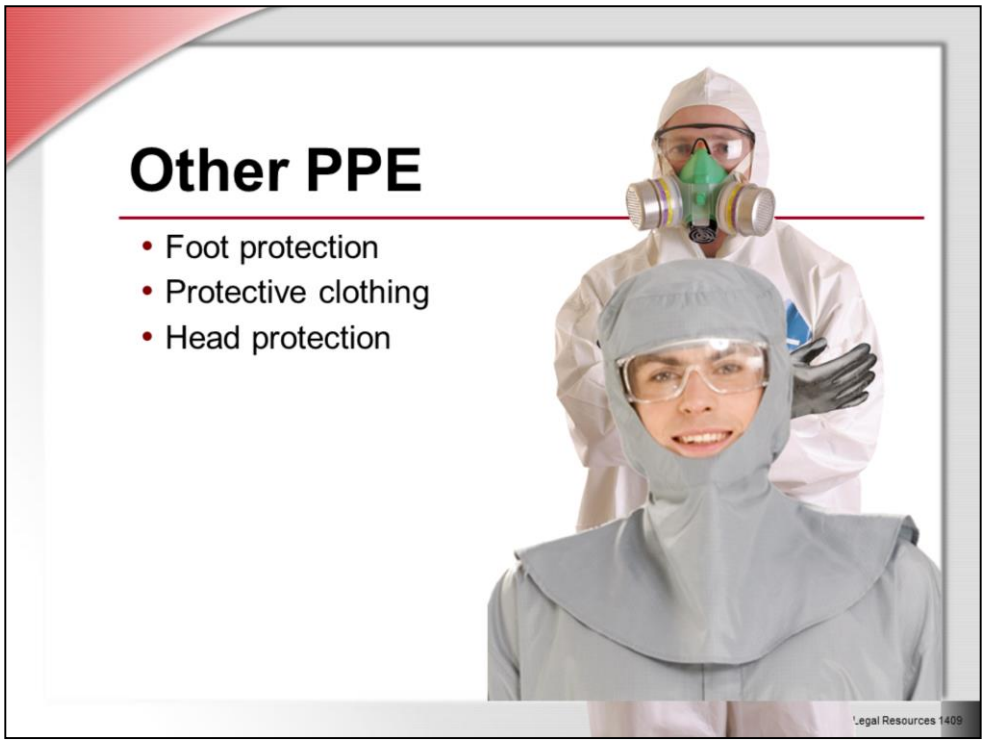
- Safety glasses should be worn whenever you are working around chemicals, even if you're just moving boxes off a shelf. Goggles offer better protection than safety glasses and should definitely be worn when there's a risk of splashes, vapors, gases, or mists.
- Face shields worn over eye protection—never in place of eye protection—protect your face from splashes or sprays.
- Respirators should be worn to protect against vapors, gases, dusts, or fumes. The type of respirator used depends on the type of chemical as well as the airborne concentration. Very high concentrations of almost any hazardous chemical will require the use of an air-supplied respirator. For lower concentrations, you can generally rely on an air-purifying respirator. The SDS will identify which type of respirator you need and which type of cartridge to use for an air-purifying respirator.

Gloves are also required when handling chemicals. The type of glove you need also depends on the hazard.

For example:

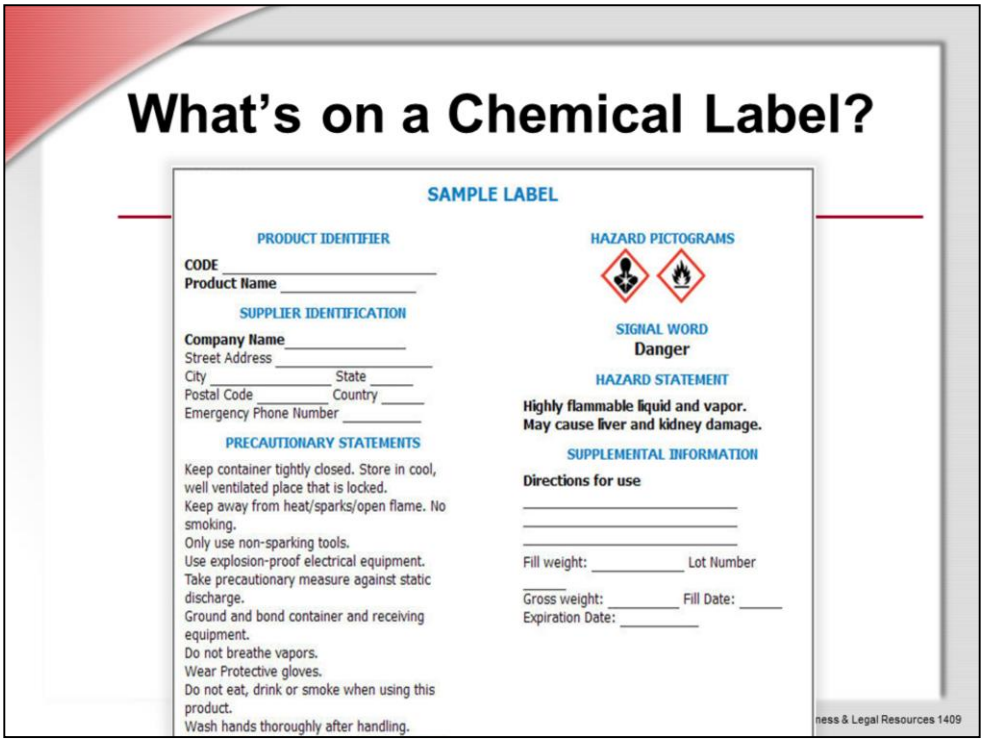
- Butyl gloves work well for ketones, esters, alcohol, and most inorganic acids and caustics.
- Latex can be used for a variety of chemicals, including most acids and caustics, salts, detergents, and alcohols. Many solvents, however, will break down latex.
- Neoprene has good protective qualities against oils, acids, caustics, and some solvents.
- Other types of gloves include nitrile, polyvinyl chloride-coated gloves, polyvinyl alcohol gloves, Viton®, and silver shield gloves, which resist permeation and breakthrough by more chemicals than any other gloves.

Each type of glove has its own special uses. The SDS will identify the best gloves to protect against specific hazards.



- In addition to protecting your eyes and hands, you may also need to protect your feet. Boots are made of many of the same materials as gloves, and protect feet against splashes and sprays.
- Protective clothing also comes in many forms. Paper-like chemicals such as Tyvec®, protect against dust but not splashes. Some suits can be purchased with different coatings to protect against different types and concentrations of chemicals. Rain suits made of rubber or PVC can protect you from a variety of liquids.
- Head protection generally comes in the form of a hood. The hood will usually be made of the same material as the protective clothing you wear. In fact, many styles of protective clothing come with hoods.

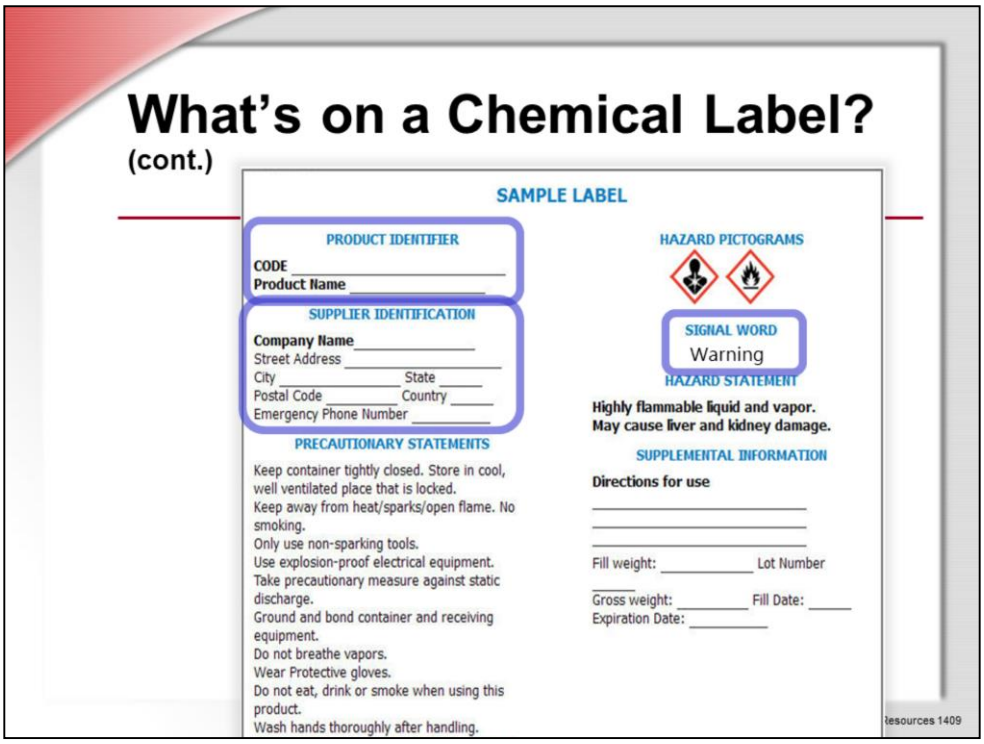
Remember to **think** about the type of PPE you need to protect against the hazards of the chemicals you are working with. You can wear all kinds of various PPE, but if you are not using the **right type**, or if you use it **incorrectly**, it will **not be effective**.



As of June 1, 2016, facilities that use hazardous chemicals must have labels containing the information **and** pictograms required by the Globally Harmonized System of Classification and Labeling of Chemicals, or GHS.

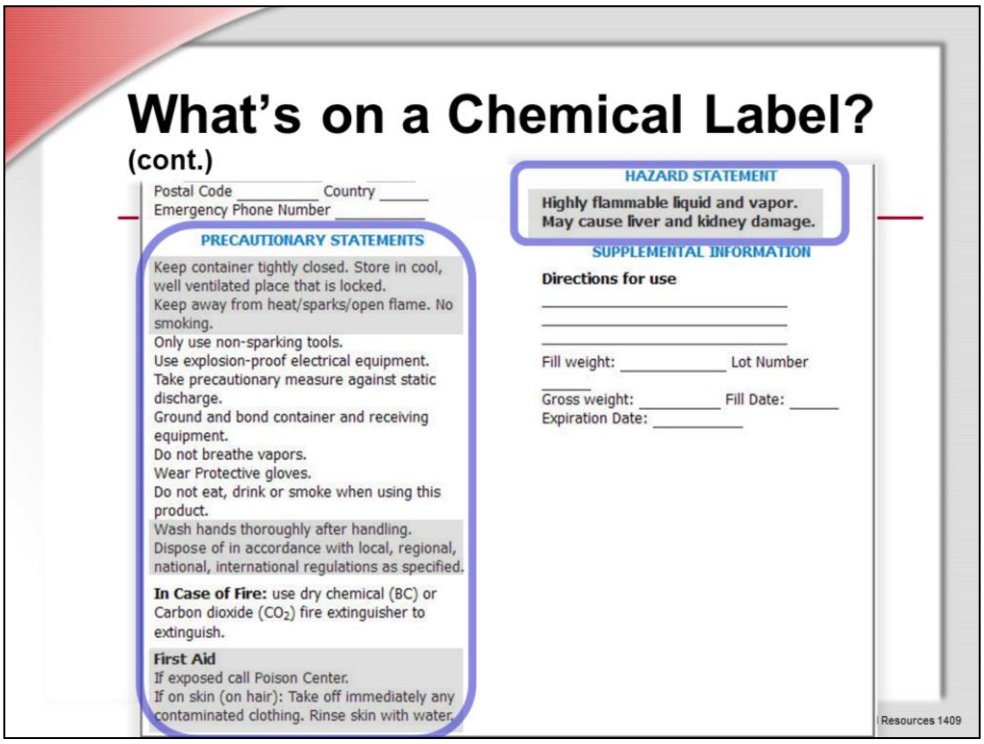
The Global Harmonized System is a system of classification and labeling for chemicals. This system is agreed upon internationally so as to provide consistency and regulation within the classification and labeling of chemicals.

What's on a Chemical Label?
(cont.)



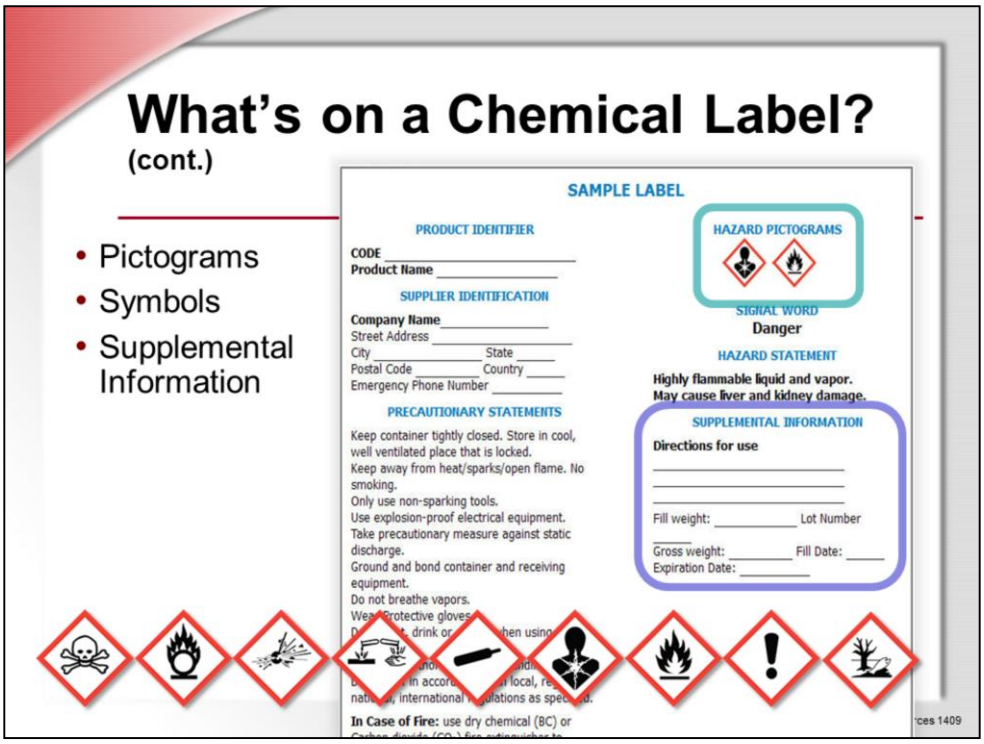
The chemical label must contain both a product identifier for the chemical **and** supplier identification information.

- The **product identifier** is the name or number that allows you to identify the chemical in the container.
- **Supplier identification** must include the name, address, and telephone number for the chemical manufacturer, importer, or other supplier.
- The chemical label will include one of two **signal words** that tell you the relative severity of the hazard presented. It alerts you to a potential hazard.
  - "Danger" is used for the more severe hazards.
  - "Warning" is used for less severe hazards and is less serious than "Danger."



- **Hazard statements** assigned to a hazard class or category appear on the label. They describe the nature of the hazard and the degree of the hazard. The hazard statement can include information on an exposure being fatal or toxic, organ damage, and routes of exposure. For example, a hazard statement could say:
  - **Highly flammable liquid and vapor. May cause liver and kidney damage.**

- **Precautionary statements** describe recommended measures that should be taken to minimize or prevent adverse effects from exposure to a chemical or improper storage or handling. Four types of precautionary statements appear on a chemical label. They are:
  1. Prevention. For example, "Wash thoroughly after handling."
  2. Response. For example, "If swallowed, immediately call a poison center."
  3. Storage. For example, "Store locked up."
  4. Disposal. For example, "Dispose of in accordance with local, regional, national, and international regulations, as specified."



- Pictograms include a symbol and other graphic elements intended to convey specific information about the hazards of a chemical. They appear on a white background within a diamond-shaped square with a red border **and** are placed on the label based on a chemical's hazard classification.

- There are eight mandatory hazard symbols used in pictograms. Each conveys the specific hazard of the chemical, with a ninth non-mandatory symbol for environmental hazards.

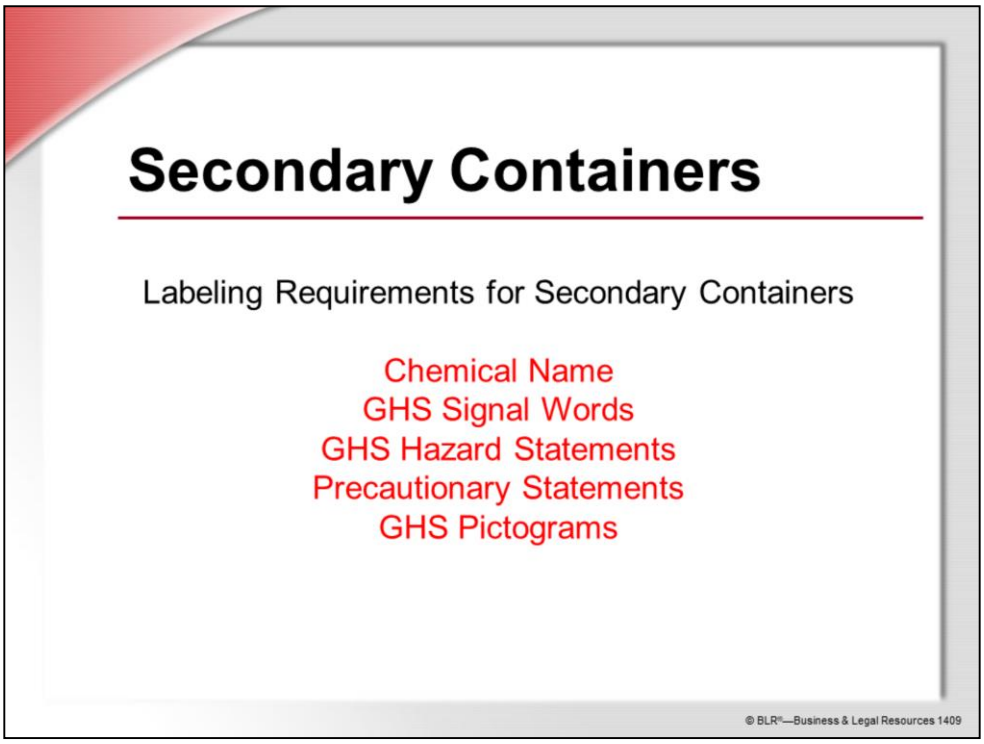
- Supplemental information includes any additional information provided on the chemical label that is not required or specified by the GHS amendments to HazCom.

HCS Pictograms and Hazards

Health Hazard	Flame	Exclamation Mark
		
▪ Carcinogen ▪ Mutagenicity ▪ Reproductive Toxicity ▪ Respiratory Sensitizer ▪ Target Organ Toxicity ▪ Aspiration Toxicity	▪ Flammables ▪ Pyrophorics ▪ Self-Heating ▪ Emits Flammable Gas ▪ Self-Reactives ▪ Organic Peroxides	▪ Irritant (skin and eye) ▪ Skin Sensitizer ▪ Acute Toxicity ▪ Narcotic Effects ▪ Respiratory Tract Irritant ▪ Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder	**Corrosion**	**Exploding Bomb**
		
▪ Gases Under Pressure	▪ Skin Corrosion/Burns ▪ Eye Damage ▪ Corrosive to Metals	▪ Explosives ▪ Self-Reactives ▪ Organic Peroxides
Flame Over Circle	**Environment** (Non-Mandatory)	**Skull and Crossbones**
		
▪ Oxidizers	▪ Aquatic Toxicity	▪ Acute Toxicity (fatal or toxic)

Secondary Containers

- Employers must ensure labels are present on containers
- Employees must label portable/ secondary containers if *used for more than their shift or if not going to be used right away*

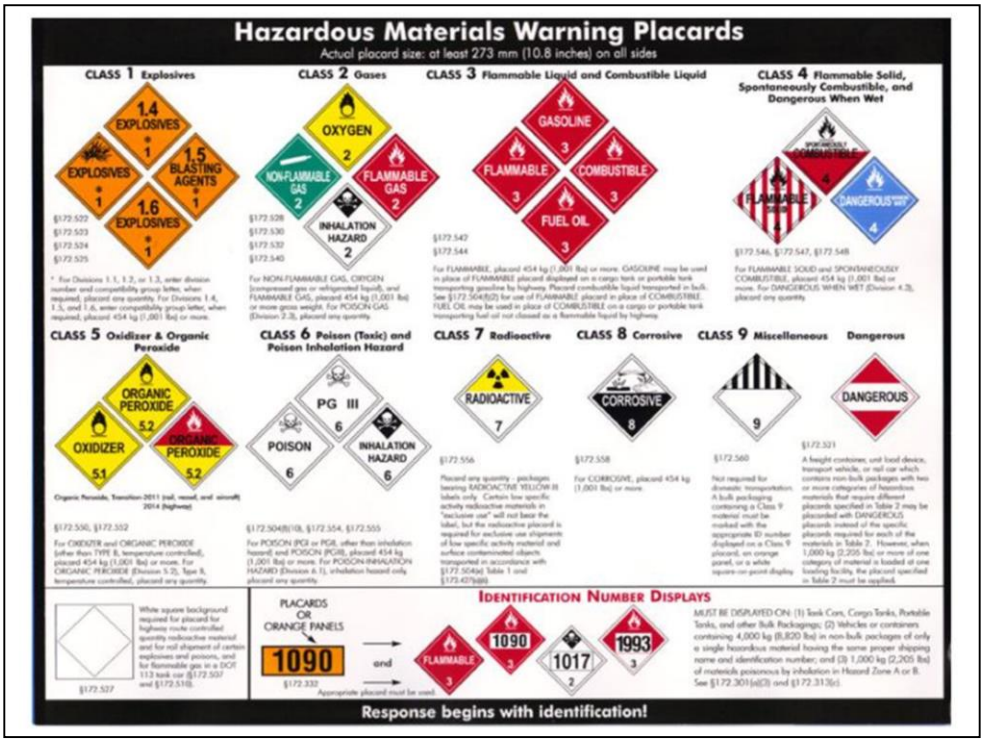


Labels on secondary containers must meet the GHS requirements. They must contain:

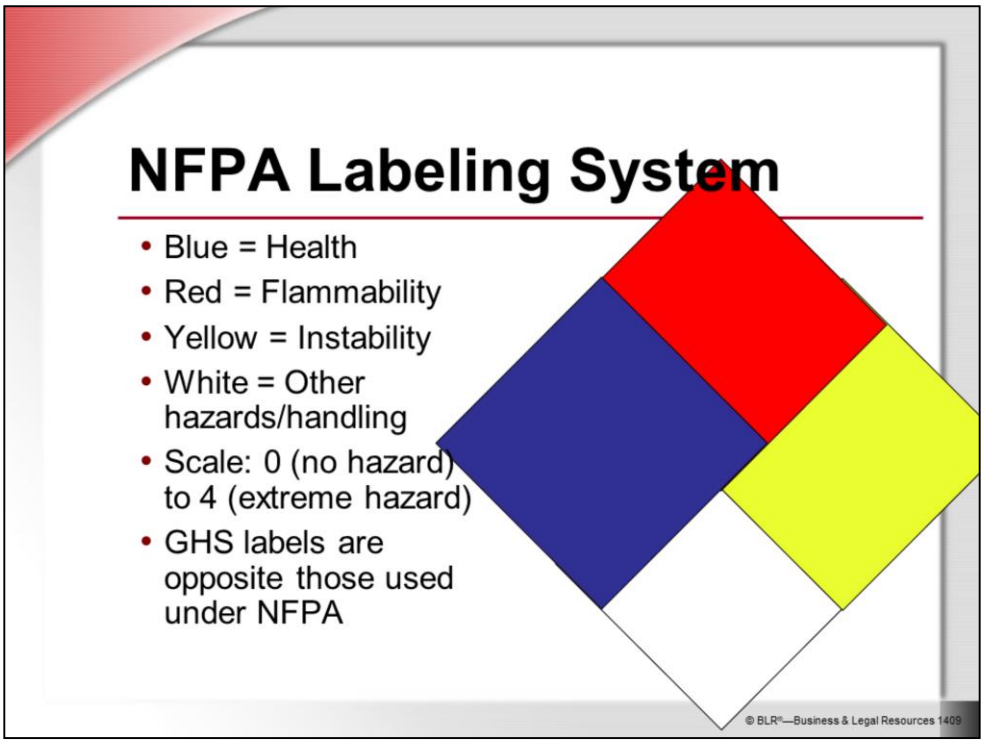
1) Chemical Name
2) GHS signal words
3) GHS hazard statements
4) Precautionary statements, and
5) GHS pictograms

Here are some examples of Department of Transportation labels. DOT labels are effective because they visually tell you about the hazard or danger associated with a hazardous chemical.

- The DOT flammable label is the one with the red background with the white flame. The number 3 at the bottom is the DOT hazard identification number, which means this is a flammable liquid. Flammable gases and solids also have the flame, but the colors vary and the numbers are different. A flammable solid has the number 4 on the label, and a flammable gas has the number 2.
- The DOT poison label is the one with the skull and crossbones. This means the chemical is toxic to humans, animals, or the environment. The number at the bottom of a poison label is 6.
- The DOT corrosive label is very descriptive. The upper half has two pictures. One shows a chemical dripping on a steel bar and eating a hole in the metal. The other shows the chemical burning a hand. The number at the bottom of the label is 8, for corrosive chemicals.



It is important to understand how to interpret DOT placards and labels. You will see them on the vehicle delivering hazardous materials **and** on the outside of boxes. They are your first clue on how to properly handle the material.



The National Fire Protection Association, or NFPA, has developed a labeling system that uses colors and numbers to warn about material hazards. The labels are typically in the shape of a larger diamond enclosing four different colored diamonds. The colors tell you the type of hazard.

- Blue represents health hazards;
- Red represents flammability hazards;
- Yellow represents instability or reactivity hazards;
- White represents other hazards or special handling recommendations;
- NFPA labels also display numbers ranging from 0, for no hazard, to 4, for extremely hazardous.

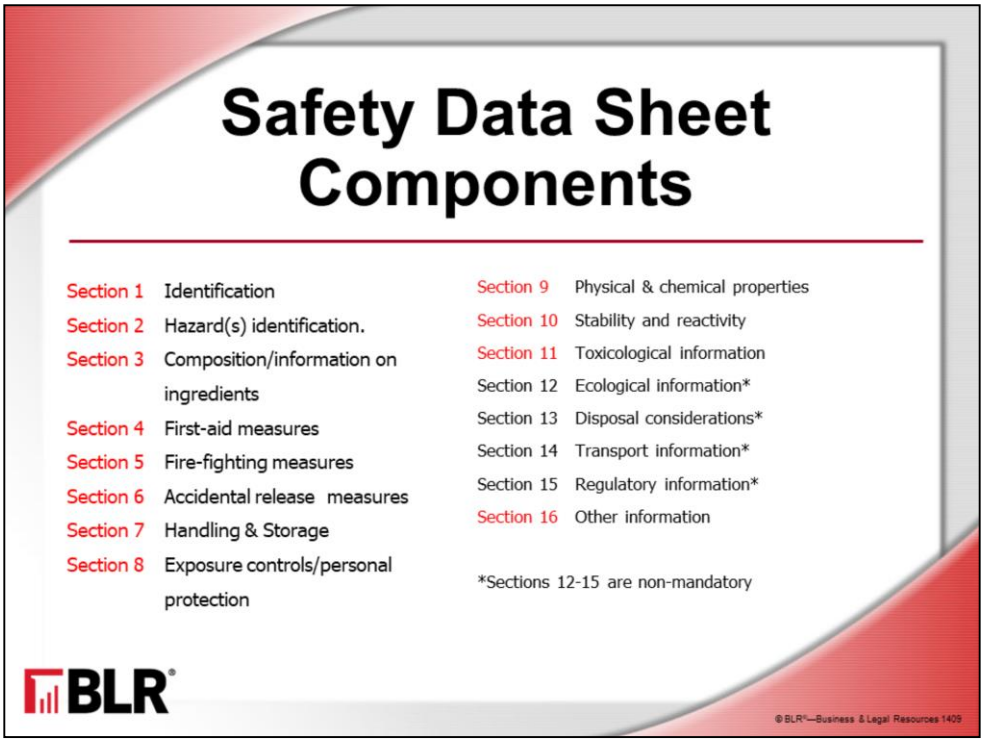
Note that the GHS system works in the opposite way. GHS has hazard numbers ranging from 1 to 4, with 1 being the most hazardous and 4 being the least hazardous. Under GHS there is no 0 (zero). Remember this to avoid confusion.

Labels give you a snapshot of the risks associated with a chemical. The safety data sheet (SDS) gives you the most complete and detailed information.

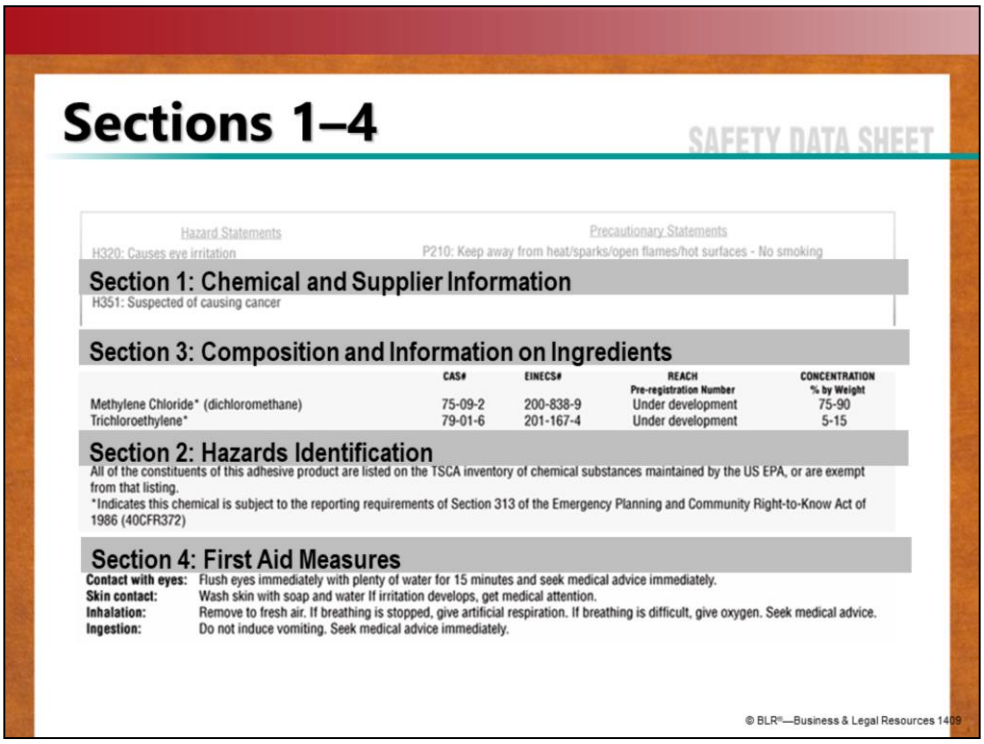
The SDS for each chemical:

- Is a detailed written description of the chemical;
- Describes its hazards, as well as precautions and remedies to releases and exposure; *and*
- Must be readily available for you to read.

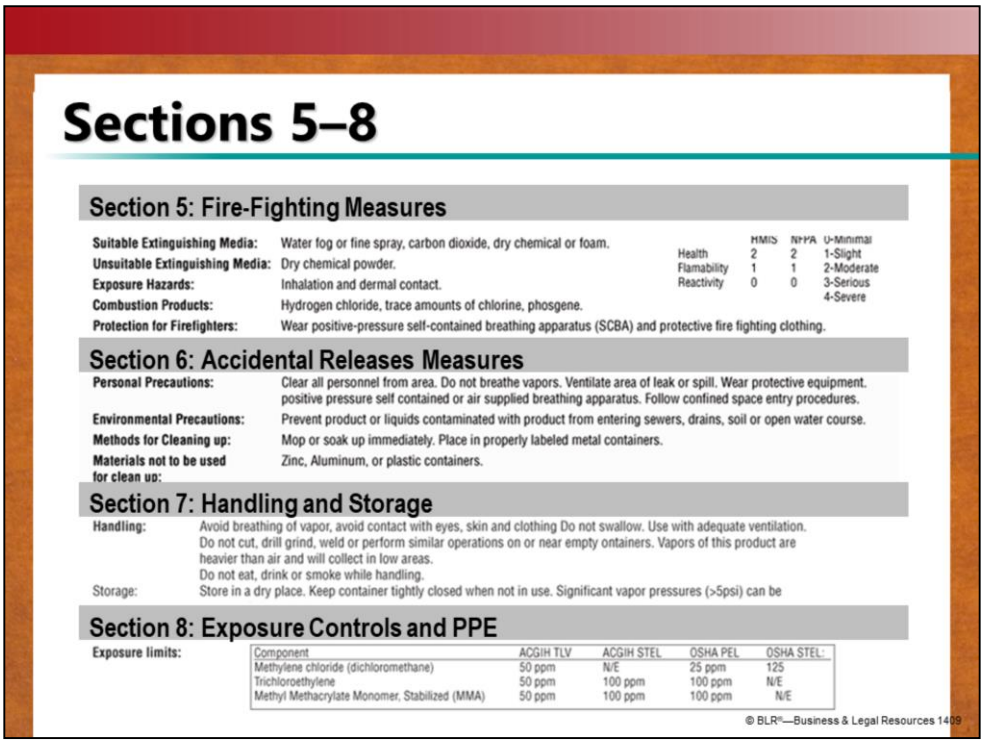
You should always read the SDS before starting to work with a chemical.



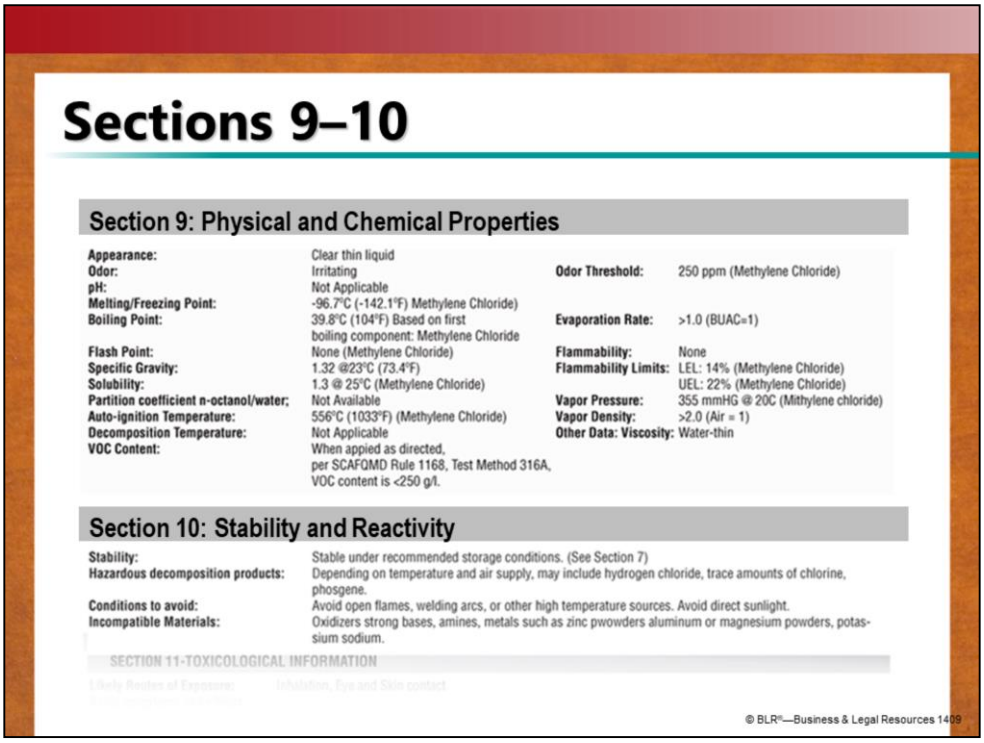
As of June 1, 2015, the Hazard Communication standard requires new SDSs to be in a uniform format and include section numbers, headings and specific information.



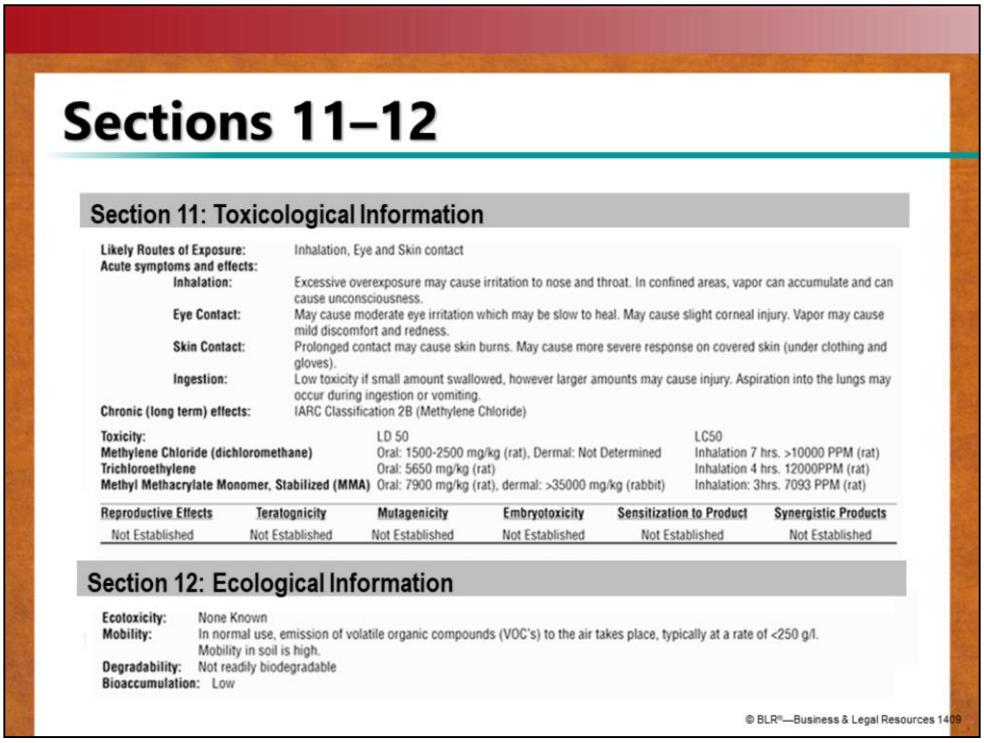
- **Section 1** contains the product identifier and other means of identification, recommended uses and restrictions, supplier information, and an emergency number.
- **Section 2** contains the hazard classification, the signal word, hazard and precautionary statements, hazard symbol, other hazards not otherwise classified, and any statements regarding mixtures consisting of ingredients of unknown toxicity.
- **Section 3** contains information about chemical composition and ingredients, including chemical name, common name and synonyms, CAS number and other unique identifiers.
- **Section 4** contains a description of necessary first aid, symptoms and health effects (acute and delayed), and the need for immediate medical attention and special treatment (if required).



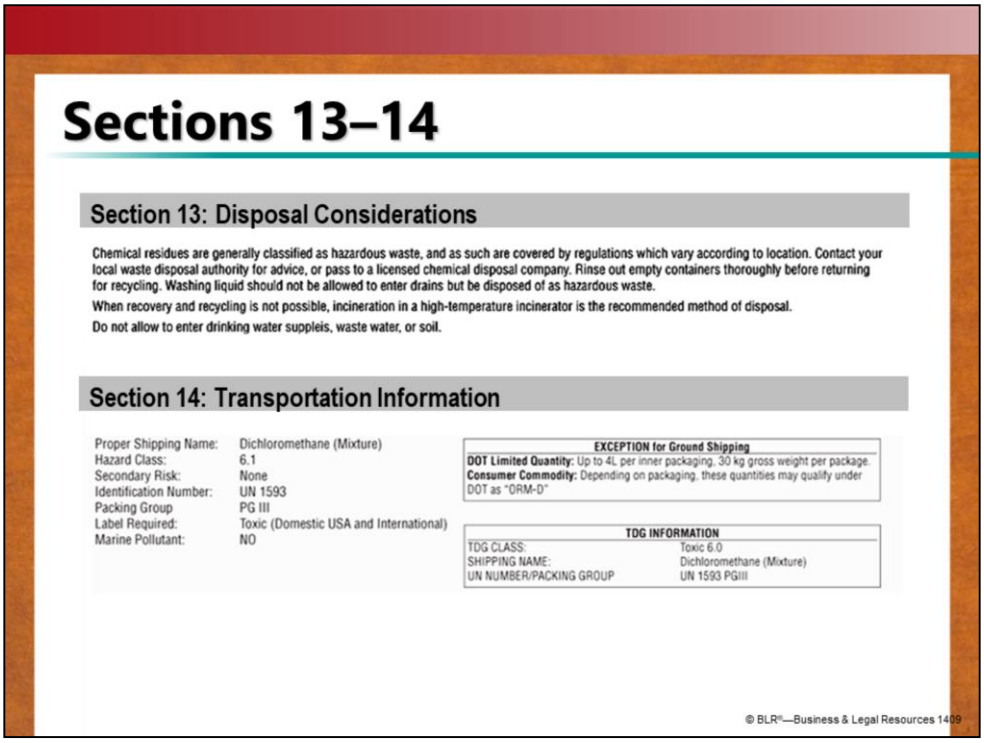
- **Section 5** contains information about suitable and unsuitable extinguishing substances, and about specific hazards from the chemical, and special PPE and precautions for firefighters.
- **Section 6** contains information about personal precautions and PPE, emergency precautions, environmental procedures, and containment and cleanup methods and materials.
- **Section 7** describes precautions for safe handling and conditions for safe storage.
- **Section 8** contains information about control parameters, engineering controls, and individual protection measures and PPE.



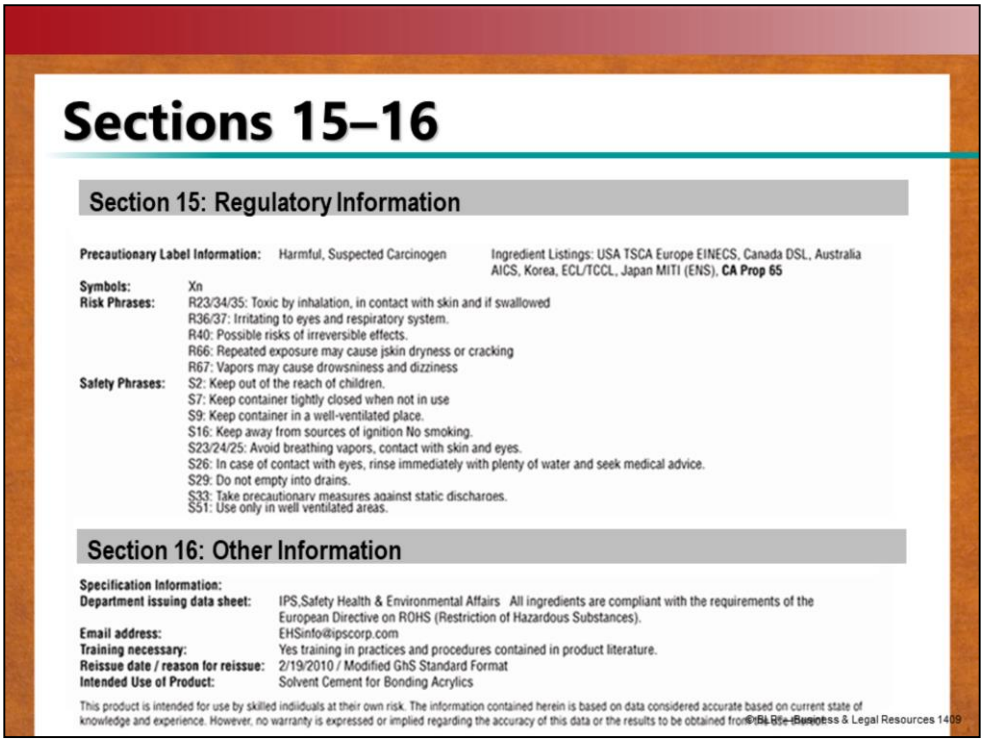
- **Section 9** contains information about the substance's physical and chemical properties, **such as** appearance, odor, melting and freezing points, flash point, and flammability.
- **Section 10** contains information about the substance's stability or reactivity, possible hazardous reactions, conditions to avoid and incompatible chemicals.



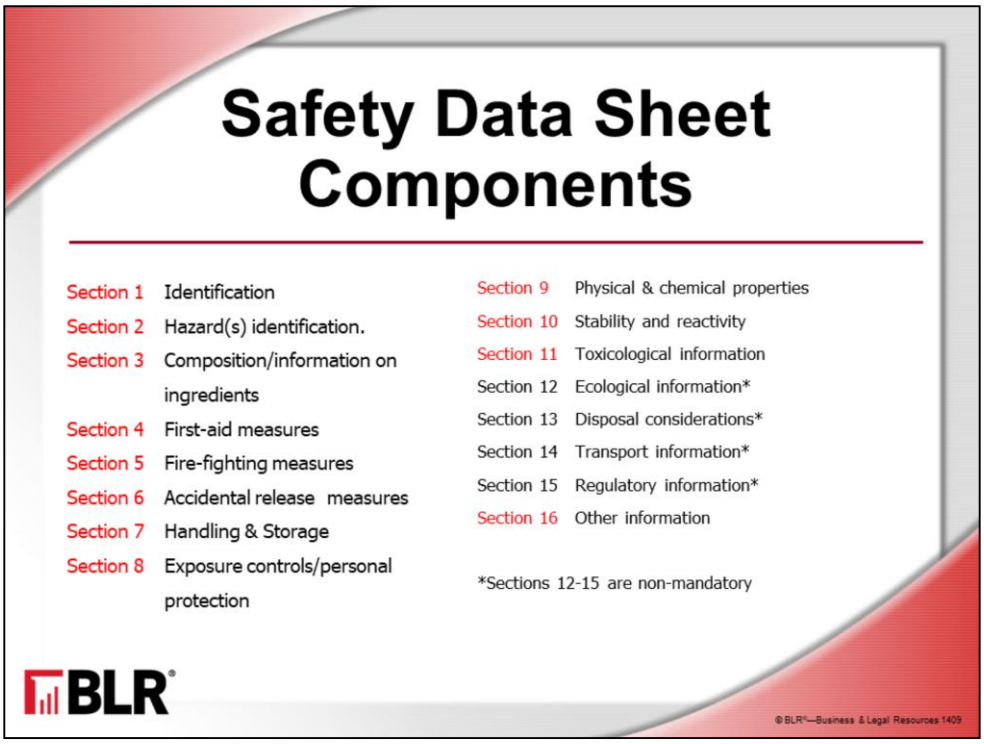
- **Section 11** contains information describing likely routes of exposure, symptoms, immediate and delayed health effects and numerical measures of toxicity.
- **Section 12** contains ecological information such as the substance's ecotoxicity, persistence and degradability, bioaccumulative potential, mobility in soil, and other adverse environmental effects.



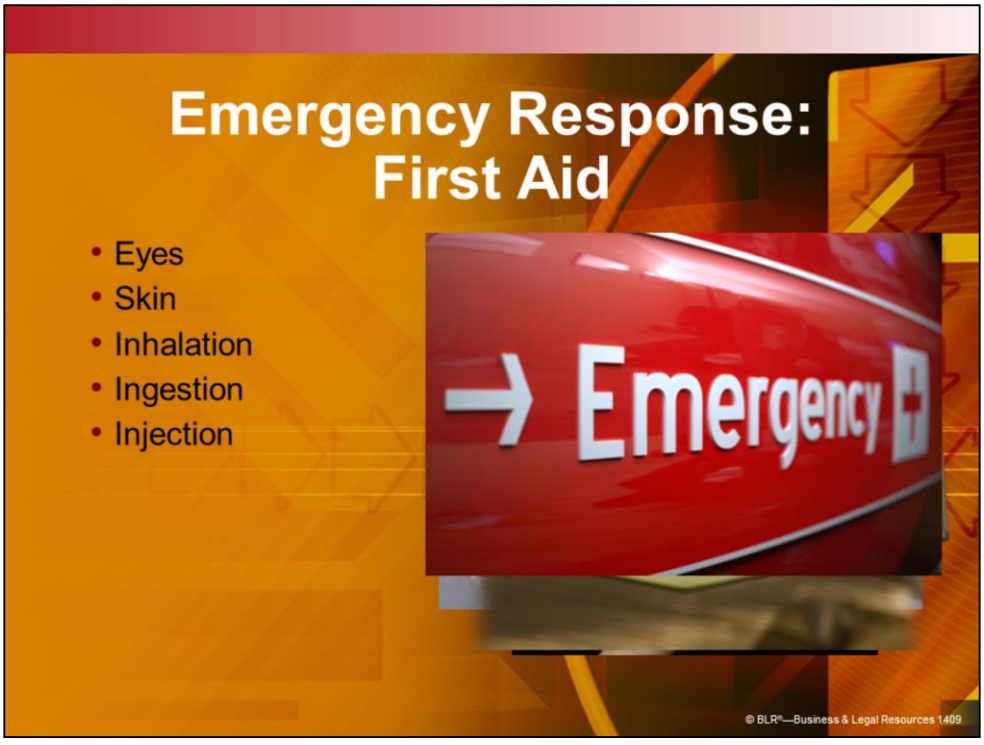
- **Section 13** provides information on waste residues and safe handling and disposal of substances and contaminated packaging.
- **Section 14** gives information on the safe transportation of the chemical.



- **Section 15** contains safety, health, and environmental regulatory information.
- **Section 16** provides other relevant information.



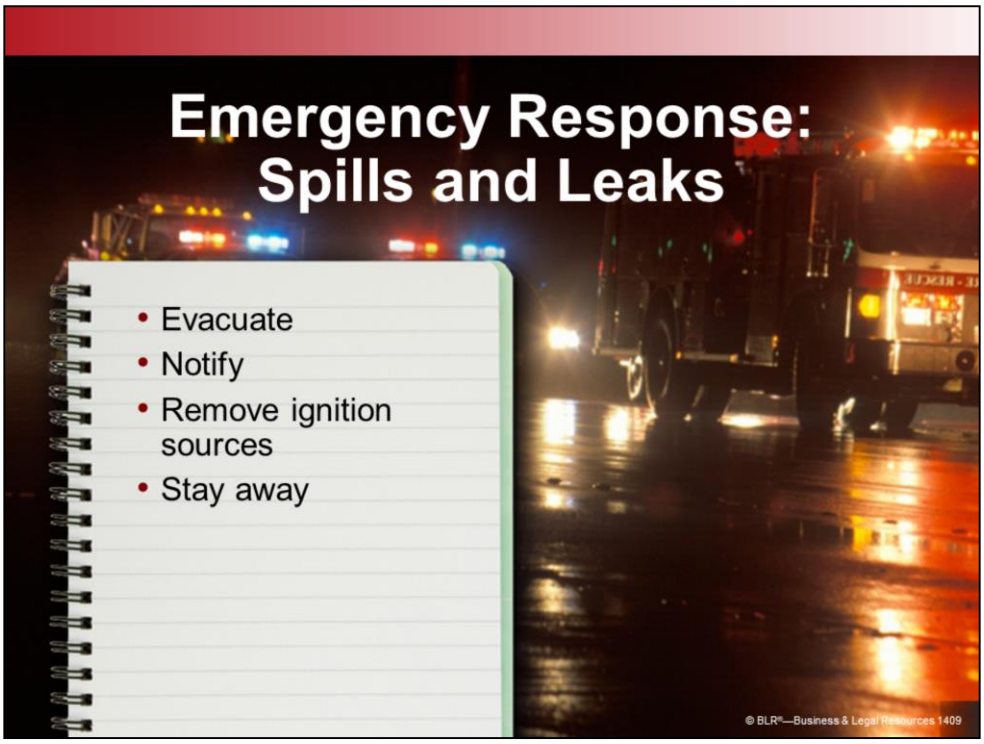
It's essential for you to be able to find safety and health information about the hazardous chemicals you work with and to know how to respond effectively in emergencies involving hazardous chemicals.



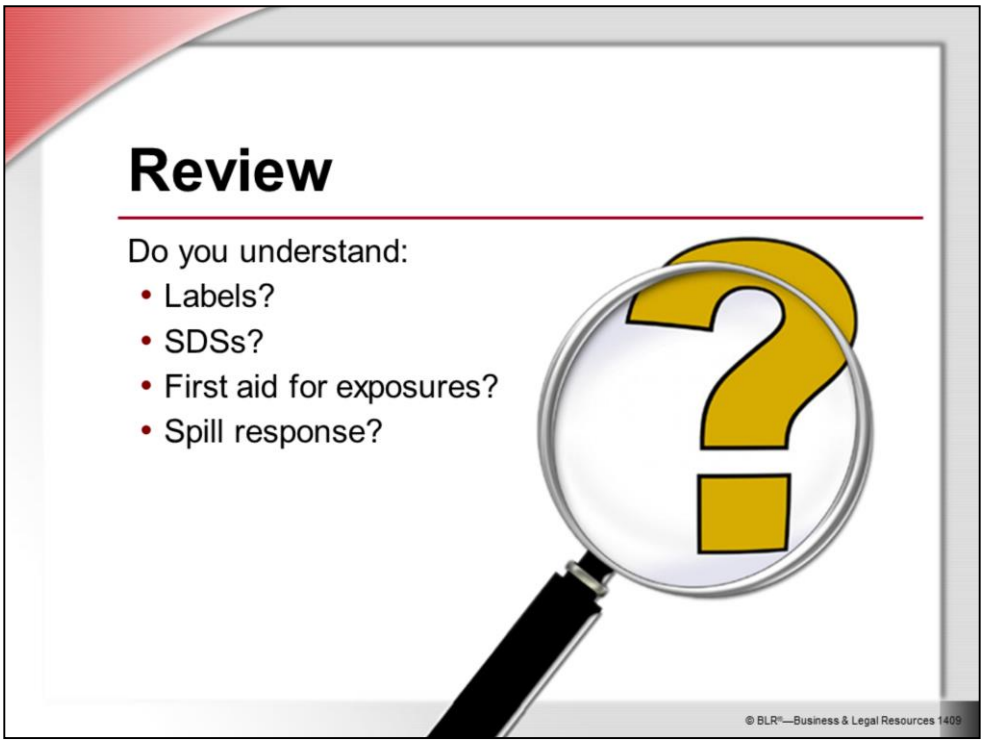
It is important always to read the label and SDS for exact first-aid procedures for hazardous chemicals. This slide contains basic procedures that are generally appropriate for most exposures.

- If chemicals **splash in your eyes**, go immediately to an eyewash station, hold your eyelids open, and flush eyes with water for about 15 minutes. Then seek medical attention.
- If you get chemicals **on your skin**, wash immediately with soap and water to remove the chemical and then flush the area well with water to remove all traces of chemical. If you get hazardous chemicals on your work clothes, remove clothes and use a safety shower to wash chemicals off your skin. Then seek medical attention.
- If you **inhale hazardous chemicals**, get away from the area and get into fresh air. If you still feel symptoms, seek medical attention.
- If you **swallow, or ingest, hazardous chemicals**, get medical assistance immediately. First aid procedures for ingestion vary, so you have to check the SDS.
- If hazardous chemicals get **under your skin**, wash the area, and seek medical attention right away.

If you do suffer an exposure, make sure you report it to your supervisor. As with any injury, if complications arise after the exposure and you did not report the injury, you will not be covered by workers compensation.



- Unless you are a member of an emergency spill response team, you should evacuate the immediate area of a spill and notify others right away.
- Tell coworkers in the area to evacuate, notify a supervisor, and call the emergency response coordinator or 911.
- If it is safe to do so, remove ignition sources. For example, if a drum of flammable liquid is leaking or spilled, you should turn off motors and machines as well as electrical power boxes in the area to prevent a spark from ignited vapors.
- Once you've safely evacuated, stay out of the area until you are told that it is safe to return.



Now is the time to ask questions about what we've discussed. Do you have any questions about:

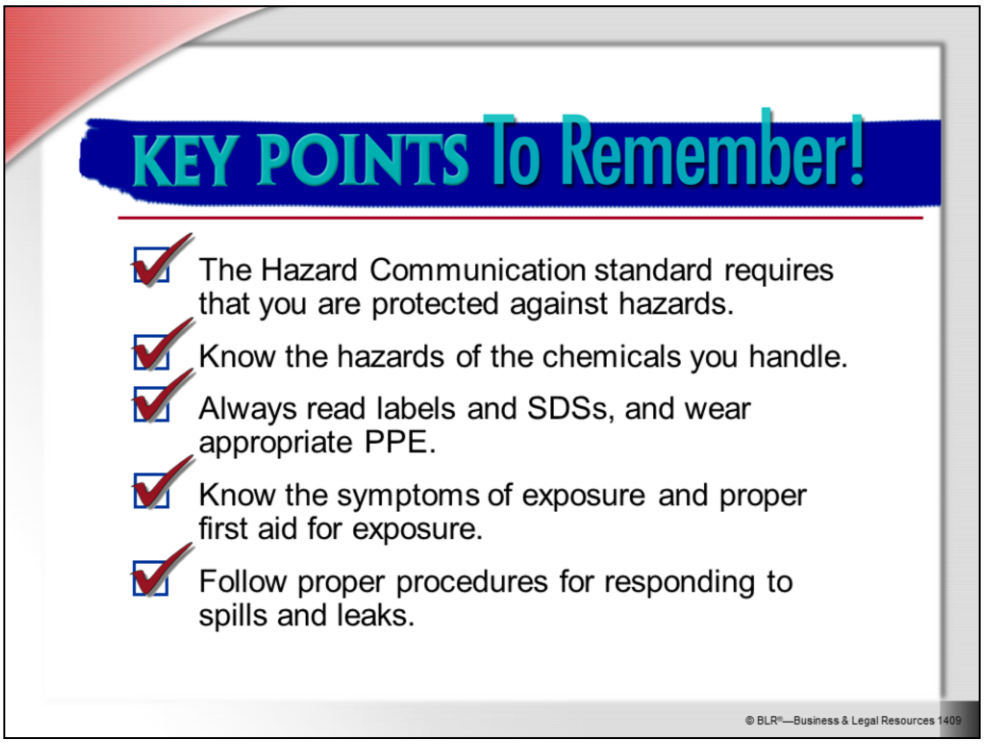
- Labels?
- SDSs?
- First aid for exposures?
- Spill response?

Where is the written plan located?

Where are your SDS sheets located?

Where is your spill kit located?

If you have any questions about the Hazard Communication Program contact the Environmental Health and Safety Department at 815-753-0404.



Here are the main points to remember from this Hazard Communication refresher course:

- The Hazard Communication standard requires employees and employers to work together to identify and protect against hazards.
- Inform yourself about the hazards of the chemicals you handle and the required safe work practices. While you have a right-to-know about the hazards of chemicals in your work area, you also have an obligation to make sure you fully understand such hazards.
- Always read labels and SDSs, and wear appropriate PPE.
- Know the symptoms of exposure and proper first aid for the chemicals you work with and around.
- Follow proper procedures for responding to spills and leaks.