Understanding the Safety Data Sheet (SDS)
Welcome to BLR training.

Hazardous chemicals can be found at many workplaces, including yours, and exposure to these chemicals may lead to negative effects on your health and damage to the environment. Therefore, it is important to know what chemicals are in your workplace, what hazards they present, and how to limit exposure to those chemicals.

The Occupational Safety and Health Administration, or OSHA, has established Hazard Communication, or HazCom regulations requiring that information relevant to the chemical hazards in your workplace be communicated to you. One of the ways this chemical information is communicated is via the Safety Data Sheet, or SDS. The implementation of the Globally Harmonized System for Classification and Labelling of Chemicals, or GHS, created an SDS format that provides chemical information in a consistent, detailed, and organized format. This allows you to find the specific information you need for any hazardous chemical product.

The main objective of this session is to describe the purpose of the GHS and introduce you to the SDS.

Be sure to ask your supervisor or trainer if you do not understand any of the information presented in the program.
### Session Objectives

By the time the session is over, you should be able to:

- Summarize the GHS and how it affects hazard communication
- Recognize the benefits of SDS access
- Explain employee access to SDSs
- Identify the sections of the SDS

By the time the session is over, you should be able to:

- Summarize the GHS and how it affects hazard communication in the workplace;
- Recognize how the SDS improves your access to vital safety, health, and environmental information about chemicals used in the workplace;
- Explain the accessibility of SDSs in the workplace; *and*
- Identify the 16 sections of the SDS and the information contained in each section.
Before we begin the session, let's take a few minutes to see how much you already know about the GHS and the SDS.
Under the GHS, OSHA will no longer regulate workplace hazardous chemicals.

- True
- False
Knowledge Check 1

Under the GHS, OSHA will no longer regulate workplace hazardous chemicals.

○ True
○ False

This is false.
All SDSs have the same number of sections.

- True
- False
UNDERSTANDING THE SAFETY DATA SHEET (SDS)

Knowledge Check 1

All SDSs have the same number of sections.

- [ ] True
- [ ] False

This is true.
**Knowledge Check 1**

The SDS will help to create a safer work environment for you and your coworkers.

- True
- False

Is this statement True or False?

The SDS will help to create a safer work environment for you and your coworkers.

- True
- False
**UNDERSTANDING THE SAFETY DATA SHEET (SDS)**

**Knowledge Check 1**

The SDS will help to create a safer work environment for you and your coworkers.

- **True**
- **False**

This is true.
You need your supervisor’s approval to see an SDS.

- True
- False
UNDERSTANDING THE SAFETY DATA SHEET (SDS)

Knowledge Check 1

You need your supervisor’s approval to see an SDS.

- [ ] True
- [x] False

This is false.
OSHA’s HazCom standard, sometimes referred to as the “worker right-to-know” rule, requires us to tell you about the chemical hazards you may be exposed to in the workplace. Two ways we do that are with

- labels on chemical containers
- and the SDS, formerly known as the Material Safety Data Sheet or MSDS.
UNDERSTANDING THE SAFETY DATA SHEET (SDS)

What is the GHS?

• Globally Harmonized System of Classification and Labelling of Chemicals
• Provides a universal approach
• Implemented through HazCom
• Consistant labels and uniform SDS

The MSDS has been an essential part of basic safety in the workplace for decades. But because of the global economy, a system is needed to standardize safety, health, and environmental information about substances so that people all over the world get the same hazard information. That system is called the GHS.

Developed by the United Nations and implemented around the world, including here in the United States, the GHS provides a universal approach to defining hazards, classifying substances, and communicating hazard information and protective measures to employers and employees.

The GHS itself is not a regulation or a standard. OSHA implements the GHS system by incorporating it into our HazCom requirements and continuing to regulate chemical safety in this country.

The GHS requires consistent label content and a uniform SDS, which is why the SDS replaced the old MSDS.
The basic goal of hazard communication is to ensure that employers and employees are provided with adequate practical, reliable, and comprehensible information on the hazards in the workplace so that they can take effective preventive and protective measures for their health and safety.

Implementation of the GHS and the use of the SDS are expected to:

• Create a safer work environment for you and your coworkers;
• Reduce workplace accidents and illnesses caused by workplace exposures in the United States and around the world;
• Provide consistent and simplified communications about substances and safe work practices;
• Create greater awareness of hazards, resulting in safer use of substances in the workplace;
• Make it easier and less costly to comply with hazard communication regulations; and
• Enhance the universal protection of human health and the environment.

For a copy of the benefits in this slide, select Benefits from Resources.
The purpose of the SDS is to provide safety and health information about chemicals to help prevent accidents and exposures. To do so, it must be accessible and comprehensible.

- SDSs must be immediately accessible during each work shift in the work area. Access can be to paper copies of the SDS or electronically, provided there are no barriers preventing immediate access.

- The GHS-compliant SDS is composed of 16 sections, which always appear in the same order.

- The information it presents is organized, consistent, and detailed. If there is no relevant information for a given parameter or section, the SDS must be marked to indicate that there is no applicable information.

During this session you’ll learn all about the SDS, its 16 sections, and the information contained in each section. Let’s get started now and look at the first section of the SDS.
The first section of the SDS identifies the chemical or mixture as well as the manufacturer or distributor. The information you’ll find in this section includes:

- The product identifier used on the label and other means of identification;
- Recommended use of the chemical and restrictions on use;
- Information about the supplier of the chemical, including name, address, and phone number; 
- An emergency phone number for obtaining information about spills and other accidents 24 hours a day, 7 days a week.

Properly identifying a product and its recommended uses is an important part of working safely with the chemical. Information about the supplier and an emergency number is critical, especially in the event of an accident involving the product.
The second section of the SDS identifies hazards of the chemical or mixture. This section includes the following information.

- The hazard classification of the chemical. These classifications include physical hazards such as flammable or reactive, health hazards such as toxic or cancer-causing, and environmental hazards such as hazards posed to an aquatic environment.

- The signal word, which used to indicate the relative level of severity of the hazard and alert the reader. The signal words used are “danger” and “warning.” “Danger” is used for more severe hazards, and “warning” is used for the less severe hazards.

- Symbols or pictograms used to convey information about the hazards.

- Hazard statements that describe the nature of the hazard, and where appropriate, the degree of the hazard.

- Precautionary statements that describe the recommended measures to take to minimize or prevent the adverse effects of being exposed to the chemical.

This section may also include a description of any hazards not otherwise classified, and statements regarding mixtures consisting of ingredients of unknown toxicity.

Think about how important it is to identify the hazards of the substances you work with. Consulting this section helps you understand the risks associated with the substances in your workplace.

For more information about the HazCom pictograms, select OSHA HazCom
Pictograms from Resources.
Information about chemical composition and ingredients is provided in Section 3. The section provides information relevant to both substances and mixtures.

For substances, this information includes chemical name; common name and synonyms; Chemical Abstract Service, or CAS, number, and other unique identifiers. It may also include information on impurities and stabilizing additives that are themselves classified and that contribute to the classification of the substance.

For mixtures, additional information provided in this section indicates the chemical name and concentration, or concentration ranges, of all ingredients that are classified as health hazards and that are present above their cutoff limits or present a health risk below their cutoff limits.
Section 4 of the SDS addresses first aid for exposures. In this section you will find a description of necessary first-aid measures categorized, to the different routes of exposure—inhalaƟon, skin and eye contact, and ingestion. The section will also inform you of the most important symptoms and health effects, both acute and delayed; and the need for immediate medical attention and special treatment when required.

It’s important to know proper first aid for exposures. Whether it’s you or a co-worker who is exposed to a substance, quick, effective, on-the-spot treatment greatly increases the chance of a full recovery.
Now it’s time for an exercise to test your knowledge of the information presented in the previous slides.
Is this statement true or false?

GHS is a regulation created by OSHA.

- True
- False
GHS is a regulation created by OSHA.

○ True
○ False

The GHS is not a regulation or standard created by OSHA. It is a system of defining hazards, classifying substances, and communicating hazard information developed by the United Nations and implemented around the world. OSHA implements the GHS by incorporating it into its hazard communication regulations.

This is false. The GHS is not a regulation or standard created by OSHA. It is a system of defining hazards, classifying substances, and communicating hazard information developed by the United Nations and implemented around the world. OSHA implements the GHS by incorporating it into its hazard communication regulations.
## Knowledge Check 2

What are some of the benefits of the GHS and the use of SDSs, in addition to providing consistent and simplified information about hazardous substances?

- [ ] Safer work environment for you and your coworkers
- [ ] Greater awareness of hazards in the workplace
- [ ] Smaller on-site inventories of hazardous substances
- [ ] Less costly to comply with hazard communication regulations

*Choose all that apply.*
What are some of the benefits of the GHS and the use of SDSs, in addition to providing consistent and simplified information about hazardous substances?

- Safer work environment for you and your coworkers
- Greater awareness of hazards in the workplace
- Smaller on-site inventories of hazardous substances
- Less costly to comply with hazard communication regulations

Implementation of the GHS and the use of SDSs provide consistent and simplified information about substances, the hazards they present, and safe work practices. The availability of this consistent and comprehensible information raises awareness of hazards, resulting in safer use of substances in the workplace, and simplifies the implementation of hazard communication, thus reducing the cost of compliance.
Knowledge Check 2

Having SDSs available to employees is optional.

- True
- False

Is this statement true or false?

Having SDSs available to employees is optional.

- True
- False
UNDERSTANDING THE SAFETY DATA SHEET (SDS)

Knowledge Check 2

Having SDSs available to employees is optional.

- True
- False

This is false. SDSs must be immediately accessible to employees in the work area during each work shift.
### UNDERSTANDING THE SAFETY DATA SHEET (SDS)

**Knowledge Check 2**

What are the signal words used in Section 2 of the SDS—Hazards Identification?

- [ ] Caution
- [ ] Warning
- [ ] Poison
- [ ] Danger

*Which of these apply?*

What are the signal words used in Section 2 of the SDS—Hazards Identification? Choose all that apply.

- [ ] Caution
- [ ] Warning
- [ ] Poison
- [ ] Danger
The signal word found in Section 2 will be either “Danger” or “Warning.” “Danger” is used for more severe hazards, and “Warning” is used for less severe hazards.
Now it’s time to ask yourself if you understand the information that has been presented so far. For example, can you explain:

- The purpose of the GHS?
- The benefits of the GHS and the SDS?
- Your access to SDSs?
- The content of Sections 1 through 4 of the SDS?

These sections identify the substance or product and all of the hazards associated with it; provide information on its composition; and describe first-aid measures that should be taken in the event of exposure.

All this information will help you understand and work with the SDS, which is a critical part of hazard communication.

Let’s continue now to the next slide and talk about Section 5 of the SDS.
Section 5 contains information about fighting fires caused by the substance. This section includes:

- Suitable and unsuitable extinguishing substances—for example, not using water on a substance that reacts with water;

- Specific hazards arising from the chemical—for example, the nature of any hazardous vapors released when the chemical is heated, used, or burned; and

- Special personal protective equipment and precautions for firefighters.

Do you know the proper procedure for reporting and responding to workplace fires, specifically to fires involving hazardous substances?
Section 6 tells you what to do in the event of an accidental release or spill. For example, it outlines personal precautions and personal protective equipment; emergency procedures; environmental procedures; and methods and materials of containment and cleanup.

Do you know the procedure for reporting and responding to spills and releases?
In Section 7 you’ll learn about safe handling and storage requirements, including:

- Precautions for safe handling of the substance; and
- Conditions for safe storage, such as identifying incompatibilities, ventilation requirements, and what substances need to be stored elsewhere.

Think about safe handling and storage requirements for the chemicals you work with. This section is the place to find the information you need to meet these requirements. If there is anything you don’t understand about proper handling or storage of a particular substance after consulting the SDS, talk to your supervisor.
Section 8 of the SDS details exposure limits and instructs you on how to protect against harmful exposures.

- The section details control parameters, such as occupational exposure limit values. For example, here you'll find the permissible exposure limit, or PEL, and the threshold limit value, or TLV. You'll also find any other exposure limit used or recommended by the manufacturer.

- You'll also read about appropriate engineering controls such as ventilation and enclosed processes required when working with the substance, replacing a toxic substance with a less hazardous one, or limiting the amount of time a worker is exposed to a hazardous substance.

- Section 8 also discusses recommendations for individual protection measures, such as required PPE. For example, this section will tell you if you need a respirator or goggles when working with the substance.

Whenever you use a new chemical, be sure to check the SDS to make sure you are equipped with the proper PPE.
Section 9 includes the information about a substance’s physical and chemical properties, including such vital information as:

- Appearance, meaning the substance’s color and physical state, specifically whether it is a solid, liquid, or gas; Odor and odor threshold; pH, which tells you whether the chemical is an acid or base; Melting point; Boiling point; Flash point; Evaporation rate; Flammability and upper and lower flammability or explosive limits; Vapor pressure, vapor density, and relative density; Solubility; Partition coefficient; Auto-ignition and decomposition temperature; and Viscosity.

- Manufacturers may also add other relevant parameters to this section. For example, in this case the manufacturer has added volatile organic compound, or VOC, content to the SDS.

- In certain instances, an SDS may not contain data for all of these parameters because the information is not available or relevant. In these instances, the SDS may not be left blank, but rather the manufacturer must indicate that the information is not available or not applicable.
In Section 10 you’ll learn about the substance’s stability and reactivity. These are two very important things to know. You need to know how a substance might become unstable or react with air, water, or other substances and thus become hazardous to you and your coworkers.

In this section, you’ll read about:

- The chemical’s stability or reactivity;
- The possibility of hazardous reactions and the conditions under which those reactions may occur;
- Hazardous decomposition products that could be produced because of use, storage, or heating;
- Conditions to avoid—for example, static discharge, shock, or vibration; and
- Incompatible materials that must be kept away from the substance.

Think about the importance of this section. What if you didn’t know the conditions under which a substance is stable or unstable? What if you didn’t know what might cause a hazardous reaction? You could be in grave danger.
Section 11 contains a concise but complete and comprehensible description of the various health effects of the substance as well as the available data used to identify those effects, including:

• Information on the likely routes of exposure—inhalation, ingestion, skin and eye contact;
• Symptoms related to the physical, chemical, and toxicological characteristics;
• Immediate and delayed health effects and chronic health effects from short- and long-term exposure;
• Numerical measures of toxicity; and
• Whether the chemical is listed in the National Toxicology Program Report on Carcinogens or by the International Agency for Research on Cancer, or IARC.

If you work with toxic substances, you want to know all there is to know about the consequences of exposure. This section will help you recognize the symptoms and effects of exposure, so that you can take appropriate actions to protect yourself.
Section 12 contains information about how the substance could affect the environment if it is spilled or released. The section includes information about:

- **Ecotoxicity**, which is how the substance poisons aquatic and terrestrial environments;
- **Mobility**, which identifies how far and wide the substance is likely to travel in the ground, and how likely it is to move from the soil into the groundwater;
- **Persistence and degradability**—in other words, how long the effects of the pollution may last; and
- **Bioaccumulative potential**, which means the likelihood of a hazardous substance being taken into an organism, such as a human or other animal, and accumulating in the body.

This section may also list other adverse environmental effects, such as hazards to the ozone layer.
Disposal Considerations

Section 13 provides information about safe handling and proper disposal methods for substances and contaminated packaging. This may include descriptions of appropriate disposal containers; appropriate disposal methods; and special precautions to take when landfilling or incinerating the substance.

Think about the substances you work with and the proper procedures for disposing of these substances and of any contaminated materials.
Section 14 explains requirements for the safe transportation of the chemical by road, air, rail, or sea. This section provides you with:

- The United Nations, or UN, number for the chemical, and the UN shipping name;
- The transport hazard class or classes;
- The packing group, if applicable;
- The environmental hazards associated with transporting the chemical, and specifically, whether the substance is a marine pollutant;
- Guidance on transporting the chemical in bulk; and

Special precautions a user needs to know or to comply with in connection with transport of the chemical either inside or outside of your workplace.
Section 15 contains information about the safety, health, and environmental regulations specific to the substance, and which is not already covered elsewhere in the SDS.

- Section 16 contains other relevant information, including the date of preparation and revision of the SDS.
Now it’s time for an exercise to see how much you remember about the information about the different sections of the SDS we presented in the previous slides.
UNDERSTANDING THE SAFETY DATA SHEET (SDS)

Knowledge Check 3

The SDS tells you what materials are incompatible with the substance and should be kept away from the substance.

- True
- False

Is this statement true or false?

The SDS tells you what materials are incompatible with the substance and should be kept away from the substance.

- True
- False
The SDS tells you what materials are incompatible with the substance and should be kept away from the substance.

This is true. Section 10 of the SDS—Stability and reactivity—lists incompatible materials that should be kept away from the substance. The section also describes the stability of the substance, conditions to avoid, and lists the hazardous products resulting from decomposition of the substance.
**UNDERSTANDING THE SAFETY DATA SHEET (SDS)**

**Knowledge Check 3**

What section of the SDS tells you if you need to wear a respirator when working with a substance?

- [ ] Section 4—First-aid measures
- [ ] Section 7—Handling and storage
- [ ] Section 8—Exposure controls and PPE
- [ ] Section 11—Toxicological information

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What section of the SDS tells you if you need to wear a respirator when working with a substance?

- Section 4—First-aid measures
- Section 7—Handling and storage
- Section 8—Exposure controls and PPE
- Section 11—Toxicological information
### Knowledge Check 3

What section of the SDS tells you if you need to wear a respirator when working with a substance?

- Section 4—First-aid measures
- Section 7—Handling and storage
- **Section 8—Exposure controls and PPE**
- Section 11—Toxicological information

Section 8 of the SDS—Precautions to Control Exposure and Personal Protection—details the PPE that should be used when working with a substance, including what type of respiratory protection should be worn, if any. The section also details relevant exposure limits and engineering controls that should be implemented when working with the substance.
When there is no relevant information for a given SDS section or parameter within a section, it will be left blank.

- True
- False
UNDERSTANDING THE SAFETY DATA SHEET (SDS)

Knowledge Check 3

When there is no relevant information for a given SDS section or parameter within a section, it will be left blank.

- **True**
- **False**

This is false. All sections and parameters of the SDS must be completed. If there is no relevant information for a given parameter or section, the SDS must be marked to indicate that the information is not available, or the parameter or section is not applicable.
UNDERSTANDING THE SAFETY DATA SHEET (SDS)

Knowledge Check 3

The date the SDS was last revised will be listed at the top of the SDS.

- True
- False

Is this statement true or false?

The date the SDS was last revised will be listed at the top of the SDS.

- True
- False
Knowledge Check 3

The date the SDS was last revised will be listed at the top of the SDS.

- True
- False

This is false. The date the SDS was prepared or most recently revised is in Section 16 of the SDS—Other information.
Can you explain Sections 5—16 of the SDS?

Let’s review briefly now to make sure you understand the information presented in the previous slides.

- Can you explain or summarize what we’ve said about Sections 5 through 16 of the SDS? The information in these sections includes firefighting measures; what to do in the event of an accidental release; information on proper storage, handling and transportation of the substance; and what PPE you should use to protect yourself from exposure when using the substance. These sections also cover the physical and chemical properties of the substance; information about its stability and reactivity; toxicological and ecological information; disposal considerations; and regulatory information.

It’s important for you to understand this information so that you will be able to locate safety and health information when you consult the SDS.

Let’s continue now to the last slide and some key points to remember about this training session.
Here are the main points to remember from this training session on understanding the safety data sheet (SDS):

- GHS-compliant SDSs provide detailed and consistent information on hazardous chemicals in format that is utilized throughout the world.
- It’s essential to your safety and health to have and know how to find complete and accurate information about the substances you work with. The SDS provides the information you need to prevent accidents and harmful exposures.
- Paper copies or electronic versions of SDSs must be immediately accessible during each work shift in the work area.
- All SDSs are composed of the same 16 sections appearing in the same order, which allows critical information to be located more easily.
- Be sure to always consult the SDS for the substances you use on the job.

This concludes the Understanding the Safety Data Sheet (SDS) training program.

Please be sure to go back and review any information that is not completely clear. If you still have questions, ask your supervisor or trainer.