

GHS SAFETY DATA SHEETS **IN THE LABORATORY**

COURSE OUTLINE

- **Most of us encounter chemicals in one form or another every day.**
 - They're used in a wide range of products and industrial processes, and are often essential in our jobs.
 - But if we don't take the proper precautions, many chemicals can be hazardous to our safety and health.
- **There are many types of potentially hazardous chemicals... flammables, corrosives, irritants, sensitizers, toxins... even carcinogens (which can cause cancer).**
 - Each of these chemicals has its own set of hazards, required safety precautions, and recommended emergency procedures.
- **So how can we work with hazardous chemicals safely?**
 - How should we handle and store them?
 - What personal protective equipment should we use?
 - What should we do in an emergency?
- **For years, "Material Safety Data Sheets" (MSDS's) provided us with the answers to these questions.**
 - MSDS's came about as part of OSHA's Hazard Communication Standard.
 - This "Right-to-Know" regulation required chemical manufacturers and importers to give their customers MSDS's for any potentially hazardous products that they supplied.
- **But although certain types of information had to be included, OSHA did not require a standard "format" for Material Safety Data Sheets.**
 - As a result, MSDS's ended up in a variety of forms... with data arranged in different ways.
 - This often made it hard to find the information that you needed.
 - In an emergency situation, this could cost valuable time.

- **Another difficulty with many Material Safety Data Sheets was that they were often written in "technical" language, as if they were intended only for health and safety professionals.**
 - However, many other types of people, such as fire-fighters, emergency medical technicians, and workers like you, also needed to be able to understand what MSDS's tell them.
- **To address these problems OSHA adopted the "Globally Harmonized System of Classification and Labeling of Chemicals" (GHS for short) into the HAZCOM Standard.**
 - The GHS was developed by the United Nations so that workers anywhere in the world would be able to understand the hazards that a chemical presents.
- **A major part of the Globally Harmonized System is the use of the GHS "Safety Data Sheet".**
 - It gives chemical manufacturers a standard format and specific, understandable language to use to describe a chemical's hazards.
- **Although compliance with the GHS is voluntary, most industrialized countries are adopting it, and will be starting to use GHS Safety Data Sheets soon, if they haven't already.**
 - So it also makes it easier for U.S. chemical companies to sell their products internationally.
- **For many workers the GHS Safety Data Sheet will look very familiar.**
 - That's because it's formatted almost exactly like one of the versions of the ANSI Material Safety Data Sheet, except for much of the information in sections two and three, whose positions are "swapped".
- **So just like ANSI MSDS's, GHS Safety Data Sheets present information in an "as needed" order.**
 - The chemical's identity, its hazards and some emergency instructions are provided up front... for quick and easy access.
 - Basic safety information is presented next... in "easy-to-understand" language.
 - Supporting technical data, as well as information for health and safety professionals, is provided later in the SDS.

- **Safety Data Sheets are designed to answer four basic questions that anyone who encounters a chemical might have:**
 - "What is the material and what are its hazards?"
 - "What should I do if a problem occurs when I'm working with this material?"
 - "What precautions should I take to prevent problems when I work with this material?"
 - "Is there anything else I should know about this material?"
- **Each of these questions is answered by one or more sections of the Safety Data Sheet. For example, Sections 1, 2, and 3 provide answers to the first question:**
 - "What is the material and what are its hazards?"
- **"Section 1" of the SDS identifies the material, using the standard GHS "Product Identifier".**
 - You'll find the same Product Identifier on both the SDS and the chemical's container label.
- **"Section 1" also lists the name, address, and telephone number of the chemical's manufacturer, importer or distributor.**
 - This is provided in case you have questions about the SDS or the material itself.
 - An emergency telephone number may also be listed for quick access to additional information.
- **"Section 2" describes the hazards that are associated with the chemical, including the information that's provided on the chemical's label, such as:**
 - The "Signal Word".
 - Hazard Statements.
 - Precautionary Statements.
 - It may also contain copies of the GHS pictograms that appear on the label.
- **"Section 3" discusses the ingredients in the chemical and its composition. It also provides additional "identifying" information such as its:**
 - Chemical identity.
 - Common name.
 - CAS and EC numbers.

- **The next important question that a Safety Data Sheet answers is...**
 - "What should I do if a problem occurs when I'm working with this material?"
 - Sections 4, 5, and 6 provide this information.
- **"Section 4" of the SDS outlines the basic "first aid measures" that can be used before professional medical assistance is available.**
 - Simple instructions are provided based on the chemical's "route of exposure".
 - For example, first aid instructions for skin contact might be... "Remove contaminated clothing. Wash skin with soap and water. Get medical attention."
- **If the material gets into your eyes, the SDS might instruct you to...**
 - "Immediately flush eyes with plenty of water for at least 15 minutes."
 - "Get immediate medical attention."
- **This section also provides information on the symptoms and effects the chemical can produce, to help you recognize if someone has been exposed.**
- **You can see why it's important to know the appropriate first aid measures before you work with a hazardous material.**
 - Be sure to read Section 4 of the SDS immediately for any chemical that you are going to use.
 - You should also know the location of first aid kits, safety showers, and eye washes in your work area.
- **"Section 5" of the GHS Safety Data Sheet provides information, precautions and instructions for fighting fires that involve the material.**
- **This section includes information on any hazards that the material could present if it burns.**
 - For instance, a fire could release poisonous fumes that are more dangerous than the material itself.

- **Appropriate "extinguishing media" to use when fighting a fire involving the chemical is also identified in this section. These may include:**
 - Water.
 - Water fog.
 - Foam.
 - Carbon dioxide.
 - Haylon and other dry chemicals.
 - Using the wrong type could make a bad situation even worse.
- **"Firefighting instructions" describing basic strategies that minimize the hazards the material may present in a fire are also provided here.**
- **The personal protective equipment necessary for fire-fighting will be listed in this section as well.**
 - This usually includes full fire-fighting gear and an SCBA ("self-contained breathing apparatus").
 - Even more protection may be necessary for some hazardous chemicals.
- **"Section 6" tells you what to do in case of spills, leaks and other accidental releases of hazardous materials. Included in this section are general procedures for...**
 - Containing a spill or other accidental release.
 - Cleaning up the hazardous material.
 - Decontaminating clothing and equipment that comes into contact with the material.
- **To review, SDS Sections 4, 5, and 6 provide information on what to do if a hazardous situation occurs.**
- **The next question the Safety Data Sheet addresses is:**
 - "What precautions can I take to prevent problems when I work with this material?"
 - For answers we turn to Sections 7, 8, 9, and 10.
- **"Section 7" covers Handling and Storage practices that will minimize the physical and health hazards of the material, as well as preserve its quality.**

- **As you would expect, the handling instructions on the SDS are often the same as the ones listed on the chemical's container label.**
 - For example, in this section you might see the caution... "Avoid contact with eyes, skin, and clothing. Ensure that containers are properly secured before moving."
- **This section also provides information on the appropriate storage conditions for the material and its container, including:**
 - Temperature.
 - Humidity.
 - Atmospheric Pressure.
 - Ventilation.
 - Vibration in the area.
 - Exposure to light.
- **Depending on the material, these may all be relevant factors for safe storage and maintaining product quality.**
- **Engineering Controls, Personal Protective Equipment, and Exposure Guidelines are addressed in Section 8 of the SDS.**
- **"Engineering Controls" might include things such as the use of local exhaust ventilation systems when working with some materials.**
 - Other materials may require "fully enclosed systems," where no release of gases or vapors can be permitted.
- **This section also lists the personal protective equipment necessary to minimize the risk of exposure. For example:**
 - To provide respiratory protection the SDS may instruct you to... "Wear a NIOSH-approved air-purifying respirator equipped with organic vapor cartridges or canisters."
 - For Eye Protection, you may be directed to... "Wear safety glasses with side-shields, or safety goggles."
 - To defend against skin contact, rubber gloves and other protective clothing might be recommended.

- **"Section 8" of the SDS will also list any:**
 - TLVs (Threshold Limit Values).
 - PELs (Permissible Exposure Limits).
 - Other established exposure guidelines for the material or its hazardous ingredients.
 - This information is used by your employer to determine the engineering controls and personal protection appropriate for the work you do.
- **"Section 9" of the SDS describes the physical and chemical properties of the chemical.**
 - This information is important for evaluating the use of a material for a specific purpose.
 - It can help to determine what precautions should be taken when working with the chemical.
- **Your employer will also use the chemical and physical characteristics listed in this section to help determine the safest work practices for your facility.**
 - The information can be helpful in identifying a chemical when its container label has been damaged or destroyed as well.
- **"Stability and Reactivity" is also information that is needed to determine safe handling, storage, transportation and disposal procedures.**
 - For this data we turn to Section 10 of the SDS.
 - This section will indicate whether the material is chemically stable... or dangerously unstable... under normal conditions.
- **"Section 10" will also describe conditions to avoid when working with the material, such as...**
 - Heat.
 - Pressure.
 - Shock.
 - Other physical stresses that might result in a hazardous situation.
- **If the material might react with another substance to create a hazardous situation... such as poisonous vapors, a fire, or an explosion... this incompatibility will be listed as well.**

- **This section of the MSDS also addresses any hazards that could be produced as a result of...**
 - Oxidation.
 - Heating.
 - Decomposition.
 - Polymerization.
 - Other chemical reactions.
- **Remember, Sections 7, 8, 9, and 10 provide the information necessary to prevent hazardous situations from occurring.**
- **This brings us to the fourth question the GHS Safety Data Sheet is designed to answer: "Is there anything else I should know about this material?"**
 - This information can be found in Section 11 through Section 16.
- **Most workers use this information under the guidance of health and safety professionals, such as industrial hygienists, environmental managers and safety directors.**
 - However, your employer may also use these sections as a reference when setting up your company's Standard Operating Procedures... so you might want to take a quick look at this information.
- **Section 11, "Toxicological Information", provides background toxicity information on the health hazards of the material. This includes:**
 - Likely routes of exposure.
 - Symptoms related to the chemical's toxicological characteristics.
 - Immediate and delayed effects of exposure.
- **Section 12, "Ecological Information", addresses the effects that the material may have on plants, wildlife, and other aspects of the environment.**
- **Section 13, "Disposal Considerations", provides information on safe and proper waste management options.**
- **Section 14, "Transport Information", includes the chemical's...**
 - UN number.
 - Proper shipping name.
 - Transport hazard classes.
 - Packing group.
 - Any special precautions that should be taken when transporting the chemical.

- **Section 15, "Regulatory Information", addresses any Federal, State and International regulations that may apply to the material.**
- **Section 16 contains other relevant information that doesn't belong in any of the previous sections of the SDS, as well as information on preparing and revising the SDS.**
- **These 16 sections make up the standard format for the GHS Safety Data Sheet.**
 - As you can see, the SDS contains a lot of information that you need to know before working with a chemical.

*** * * SUMMARY * * ***

- **GHS Safety Data Sheets provide information about the chemicals that you work with.**
- **SDS's are organized much like an ANSI MSDS, and contain much of the same type of information.**
- **The information in an SDS is presented in an "as needed" order.**
- **Some of the information from an SDS also appears on a chemical's container label.**
- **GHS Safety Data Sheets are a valuable tool for working with hazardous chemicals, and understanding them will help you to do your job safely.**
- **So make sure you know where the SDS's are in your facility. And read them before you use any chemicals that you work with!**