Hazard Communication Safety Data Sheets

Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Hazard Communication Safety Data Sheets

- The Hazard Communication Standard (HCS) requires that the chemical manufacturer provide Safety Data Sheets (SDSs) for each hazardous chemical to users to communicate the information on the hazards.
- These were formerly known as Material Safety Data Sheets or MSDSs.

Hazard Communication Safety Data Sheets

- The information contained in the SDS is the same as what was previously required in the MSDS, except that now the SDSs are required to be presented in a consistent user-friendly 16-section format.
- The information must be in English, but may be in other languages as well.

Hazard Communication Safety Data Sheets

- The SDS includes information such as:
  - properties of each chemical
  - physical health hazards
  - environmental health hazards
  - protective measures
  - safety precautions for handling, storing, and transporting the chemical

Safety Data Sheet Content

- Sections 1 through 8 contain general information about:
  - the chemical
  - identification
  - hazards
  - composition
  - safe handling practices
  - emergency control measures

Safety Data Sheet Content

- Sections 9 through 11 and 16 contain other technical and scientific information such as:
  - Physical properties
  - Chemical properties
  - Stability and reactivity information
  - Toxicological information
  - Exposure control information
  - Date of preparation or last revision

Safety Data Sheet Content

- The SDS must also state that no applicable information was found when the preparer does not find relevant information for any required element.
- The SDS must also contain Sections 12 through 15, but OSHA will not enforce the content of these sections because they concern matters handled by other agencies.

Section 1: Identification

- This section identifies the chemical on the SDS as well as the recommended uses.

- It also provides the essential contact information of the supplier.

Section 1: Required information

- Product identifier used on the label
- Any other common names or synonyms by which the substance is known
- Name, address, and phone number of the manufacturer
- Emergency phone number
- Recommended use of the chemical (e.g., a brief description of what is actually does, such as flame retardant) and any restrictions on use

Section 2: Hazard(s) Identification

- This section identifies the hazards of the chemical presented on the SDS and the appropriate warning information associated with those hazards.

Section 2: Required information

- Hazard classification of the chemical (e.g., flammable liquid, category)
- Signal word
- Hazard statement(s)
- Precautionary statement(s)
- Pictograms
  - May be presented as graphical reproductions of the symbols in black and white.
  - May be the name of the symbol (e.g., skull and crossbones, flame)

Section 2: Required information

- Description of any hazards not otherwise classified
- For a mixture that contains an ingredient(s) with unknown toxicity, a statement describing how much (percentage) of the mixture consists of ingredient(s) with unknown acute toxicity.
  - This is a total percentage of the mixture and not tied to the individual ingredient(s).

Section 3:
Composition/Information on Ingredients

- This section identifies the ingredient(s) contained in the product indicated on the SDS, including impurities and stabilizing additives.
- This section includes information on substances, mixtures, and all chemicals where a trade secret is claimed.

Section 3: Required information

- Substances
  - Chemical name
  - Common name and synonyms
  - Chemical Abstracts Service (CAS) number and other unique identifiers
  - Impurities and stabilizing additives, which are themselves classified and which contribute to the classification of the chemical

Section 3: Required information

- Mixtures
  - Same information required for substances
  - The chemical name and concentration (exact percentage) of all ingredients which are classified as health hazards and are:
    - Present above their cut-off/concentration limits or
    - Present a health risk below the cut-off/concentration limits

Section 3: Required information

- Mixtures
  - The concentration (exact percentages) of each ingredient must be specified except concentration ranges may be used in the following situations:
    - A trade secret claim is made,
    - There is batch-to-batch variation, or
    - The SDS is used for a group of substantially similar mixtures

Section 3: Required information

- Chemicals where a trade secret is claimed
  - A statement that the specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret is required.

Section 4: First-Aid Measures

- This section describes the initial care that should be given by untrained responders to an individual who has been exposed to the chemical.

Section 4: Required information

- Necessary first-aid instructions by relevant routes of exposure (inhalation, skin and eye contact, and ingestion).
- Description of the most important symptoms or effects, and any symptoms that are acute or delayed.
- Recommendations for immediate medical care and special treatment needed, when necessary.

Section 5: Fire-Fighting Measures

- This section provides recommendations for fighting a fire caused by the chemical.
- Required information
  - Recommendations of suitable extinguishing equipment, and information about extinguishing equipment that is not appropriate for a particular situation.
  - Advice on specific hazards that develop from the chemical during the fire, such as any hazardous combustion products created when the chemical burns.
  - Recommendations on special protective equipment or precautions for firefighters.

Section 6: Accidental Release Measures

- This section provides recommendations on the appropriate response to spills, leaks, or releases, including containment and cleanup practices to prevent or minimize exposure to people, properties, or the environment.
- It may also include recommendations distinguishing between responses for large and small spills where the spill volume has a significant impact on the hazard.

Section 6: Required information

- Use of personal precautions (such as removal of ignition sources or providing sufficient ventilation) and protective equipment to prevent the contamination of skin, eye, and clothing.
- Emergency procedures, including instructions for evacuations, consulting experts when needed, and appropriate protective clothing.

Section 6: Required information

- Methods and materials used for containment
  - Covering drains and capping procedures
- Cleanup procedures
  - Appropriate techniques for neutralization, decontamination, cleaning or vacuuming
  - Adsorbent materials
  - Equipment required for containment/clean up

Section 7: Handling and Storage

- This section provides guidance on the safe handling practices and conditions for safe storage of chemicals.
- Required information
  - Precautions for safe handling, including recommendations for handling incompatible chemicals, minimizing the release of the chemical into the environment, and providing advice on general hygiene practices.
  - Recommendations on the conditions for safe storage, including incompatibilities.
  - Provide advice on specific storage requirements (such as ventilation requirements).

Section 8: Exposure Controls/Personal Protection

- This section indicates the exposure limits, engineering controls, and personal protective measures that can be used to minimize worker exposure.

Section 8: Required information

- OSHA Permissible Exposure Limits (PELs), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), and any other exposure limit used or recommended by the chemical manufacturer.
- Appropriate engineering controls
  - Use local exhaust ventilation, or use only in an enclosed system

Section 8: Required information

- Recommendations for personal protective measures to prevent illness or injury from exposure to chemicals, such as personal protective equipment (PPE)
  - Appropriate types of eye, face, skin or respiratory protection needed based on hazards and potential exposure
- Any special requirements for PPE, protective clothing or respirators
  - Type of glove material, such as PVC or nitrile rubber gloves
  - Breakthrough time of the glove material

Section 9: Physical and Chemical Properties

- This section identifies physical and chemical properties associated with the substance or mixture.
- The SDS may not contain every item on the required information list because the information may not be relevant or is not available.
  - When this occurs, a notation to that effect must be made for that chemical property.

Section 9: Required information

- Appearance
  - physical state, color, etc.
- Odor
- Odor threshold
- pH
- Melting point/freezing point
- Initial boiling point and boiling range
- Flash point
- Evaporation rate
- Flammability (solid, gas)
- Upper/lower flammability or explosive limits
- Vapor pressure
- Vapor density
- Relative density

Section 9: Required information

- Solubility(ies)
- Partition coefficient: n-octanol/water
- Auto-ignition temperature
- Decomposition temperature
- Viscosity

Section 10: Stability and Reactivity

- This section describes the reactivity hazards of the chemical and the chemical stability information.
- This section is broken into three parts
  - Reactivity
  - Chemical stability
  - Other

Section 10: Required information

- Reactivity
  - Description of the specific test data for the chemical(s).
  - This data can be for a class or family of the chemical if such data adequately represent the anticipated hazard of the chemical(s).

Section 10: Required information

- Chemical stability
  - Indication of whether the chemical is stable or unstable under normal ambient temperature and conditions while in storage and being handled.
  - Description of any stabilizers that may be needed to maintain chemical stability.
  - Indication of any safety issues that may arise should the product change in physical appearance.

Section 10: Required information

- Other
  - Indication of the possibility of hazardous reactions, including a statement whether the chemical will react or polymerize, which could release excess pressure or heat, or create other hazardous conditions.
    - A description of the conditions under which hazardous reactions may occur.

Section 10: Required information

- Other
  - List of all conditions that should be avoided
    - Static discharge, shock, vibrations, or environmental conditions that may lead to hazardous conditions.
  - List of all classes of incompatible materials (classes of chemicals or specific substances) with which the chemical could react to produce a hazardous situation.

Section 10: Required information

- Other
  - List of any known or anticipated hazardous decomposition products that could be produced because of use, storage, or heating.
    - Hazardous combustion products should also be included in Section 5 (Fire-Fighting Measures) of the SDS.

Section 11: Toxicological Information

- This section identifies toxicological and health effects information or indicates that such data are not available.

Section 11: Required information

- Information on the likely routes of exposure
  - Inhalation, ingestion, skin and eye contact
  - The SDS should indicate if the information is unknown
- Description of the delayed, immediate, or chronic effects from short- and long-term exposure.
- The numerical measures of toxicity
  - Acute toxicity estimates such as the median lethal dose (LD_{50})

Section 11: Required information

- Description of the symptoms
  - This description includes the symptoms associated with exposure to the chemical including symptoms from the lowest to the most severe exposure.
- Indication of whether the chemical is listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest editions) or found to be a potential carcinogen by OSHA.

Section 12: Ecological Information (non-mandatory)

- This section provides information to evaluate the environmental impact of the chemical(s) if it were released to the environment.

Section 12: Information may include

- Data from toxicity tests performed on aquatic and/or terrestrial organisms
  - Acute or chronic aquatic toxicity data for fish, algae, crustaceans, and other plants
  - Toxicity data on birds, bees, and plants
- Whether there is a potential for the chemical to persist and degrade in the environment either through biodegradation or other processes, such as oxidation or hydrolysis.

Section 12: Information may include

- Results of tests of bioaccumulation potential, making reference to the octanol-water partition coefficient (K_{ow}) and the biconcentration factor (BCF).
- The potential for a substance to move from the soil to the groundwater.
  - Indicate results from adsorption studies or leaching studies

Section 12: Information may include

- Other adverse effects
  - Environmental fate
  - Ozone layer depletion potential
  - Photochemical ozone creation potential
  - Endocrine disrupting potential
  - Global warming potential

Section 13: Disposal Considerations (non-mandatory)

- This section provides guidance on proper disposal practices, recycling or reclamation of the chemical(s) or its container, and safe handling practices.
- To minimize exposure, this section should also refer the reader to Section 8 (Exposure Controls/Personal Protection) of the SDS.

Section 13: Information may include

- Description of appropriate disposal containers to use.
- Recommendations of appropriate disposal methods to employ.
- Description of the physical and chemical properties that may affect disposal activities.
- Language discouraging sewage disposal.
- Any special precautions for landfills or incineration activities.

Section 14: Transport Information (non-mandatory)

- This section provides guidance on classification information for shipping and transporting of hazardous chemical(s) by road, air, rail, or sea.

Section 14: Information may include

- UN number
  - Four-figure identification number of the substance found in the Hazardous Materials Table (HMT) at 49 CFR 172.101.
- UN proper shipping name (from HMT)
- Transport hazard class(es) (from HMT)
- Packing group number, if applicable, based on the degree of hazard (from HMT)
- Environmental hazards
  - Identify if it is a marine pollutant according to the International Maritime Dangerous Goods Code.

Section 14: Information may include

- Guidance on transport in bulk according to Annex II of MARPOL 73/78 and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (International Bulk Chemical Code).
- Any special precautions which an employee should be aware of or needs to comply with, in connection with transport or conveyance either within or outside their premises.
  - When information is not available, it should be indicated.

Section 15: Regulatory Information (non-mandatory)

- This section identifies the safety, health, and environmental regulations specific for the product that is not indicated anywhere else on the SDS.
- Information may include
  - Any national and/or regional regulatory information of the chemical or mixtures, including any OSHA, Department of Transportation, Environmental Protection Agency, or Consumer Product Safety Commission regulations.

Section 16: Other Information

- This section indicates when the SDS was prepared or when the last known revision was made.
- The SDS may also state where the changes have been made to the previous version.
- The supplier may be contacted for an explanation of the changes.
- Other useful information may also be included here.

Safety Data Sheets and Labels

- The same language is used on both SDSs and labels, so comprehension is essential.
  - If you come across a term that is unfamiliar to you, please reference the *OSHA Glossary of Terms*.
- The label elements come from Sections 1 and 2 of the SDS.
- Let's look at an example…
  - We're looking at the SDS and are going to determine what the label would look like from the information provided in Sections 1 and 2.

Safety Data Sheets and Labels

- Section 1 provides the following information:
  - Product identifier
    - Product name: HS85
    - Batch number: 85L6543
  - Supplier Identification
    - Company name: GHS Example Company
    - Company address: 123 Global Circle, Anyville, NY 130XX
    - Emergency phone number: (888) 888-8888

Safety Data Sheets and Labels

- Section 2 provides the following information:
  - GHS Classification: Acute Oral Toxicity (Category 4)
    - This is used to determine the pictogram, signal word, hazard and precautionary statements.
  - Pictogram: 
    - Note that if the Acute Oral Toxicity had been Category 1, 2, or 3 the pictogram would have been skull and crossbones.

Safety Data Sheets and Labels

- Section 2 provides the following information:
  - Signal Word: Warning
    - Note that if the Acute Oral Toxicity had been Category 1, 2, or 3 the Signal Word would have been Danger.
  - Hazard Statements: Harmful if swallowed.
  - Precautionary Statements:
    - Prevention:
      - Wash hands and face thoroughly after handling.
      - Do not eat, drink or smoke when using this product.

Safety Data Sheets and Labels

- Section 2 provides the following information:
  - Precautionary Statements:
    - Response:
      - If swallowed: Call a doctor if you feel unwell.
      - Rinse mouth.
    - Storage:
      - None specified.
    - Disposal:
      - Dispose of contents/container in accordance with local/regional/national/international regulations.

The HS85 Label

HS85
Batch number: 85L6543

Warning
Harmful if swallowed

Wash hands and face thoroughly after handling. Do not eat, drink or smoke when using this product. Dispose of contents/container in accordance with local, state and federal regulations.

First aid:
If swallowed: Call a doctor if you feel unwell. Rinse mouth.

GHS Example Company, 123 Global Circle, Anyville, NY 130XX Telephone (888) 888-8888

Using SDSs in the Laboratory

- A key component for chemical safety is proper handling and storage.
  - Section 2 has the precautionary statements.
  - Section 7 provides precautions and recommendations for safe handling and storage.
    - Pay particular attention to incompatible chemicals and specific storage requirements.
  - Section 8 provides information on appropriate engineering controls and recommendations for personal protective equipment.

Using SDSs in the Laboratory

- Section 10 provides information on the stability of the chemical under normal conditions as well as conditions that may result in hazardous reactions, conditions to avoid, and hazardous decomposition products that could be produced.
- Section 11 provides information on symptoms associated with exposure.

Using SDSs in the Laboratory

- SDSs can also be used prior to ordering a chemical to ensure proper handling and storage upon arrival.
  - If Section 7 indicates that the chemical should be handled under nitrogen, protected from moisture, and stored under nitrogen, a way to meet those conditions must be available prior to ordering the chemical.

Using SDSs in the Laboratory

- Section 8 lists the required engineering controls that must be available prior to ordering the chemical.
- Section 8 also lists the recommended personal protective equipment that needs to be available prior to ordering the chemical.
  - This is particularly important when the recommendation includes respiratory protection (which requires a medical evaluation and possibly fit testing).

Using SDSs in the Laboratory

- Section 10 lists the stabilizers that will be needed prior to ordering the chemical to maintain stability.
- Section 6 lists the materials and/or equipment needed for spill response that must be available prior to ordering the chemical.
  - Note that if the cleanup procedure calls for adsorbent materials there must be enough on hand to adsorb the amount to be ordered.

☆Transition reminder☆

- Remember that we are in a transitional period right now.
- Full compliance will not be required until June 1, 2015.
- Between now and then there will be a mix of old and new labels and old and new SDSs.

Time for a look at some SDSs!

- This concludes the online training for Safety Data Sheets.
- The class segment will involve
  - Looking at some SDSs to ensure an understanding of where information is found in the 16-section format and how the information on the label is related to the SDS.
  - An overview of the health hazard classification tables not covered in the previous trainings.
- The test for SDSs will be at the conclusion of the class segment.




For more information:

OSHA® Occupational Safety and Health Administration

U.S. Department of Labor

www.osha.gov (800) 321-OSHA (6742)