Safety Data Sheets Under GHS – Quick Tips

Providing accurate information to people who use, handle or store hazardous chemicals is paramount to workplace safety. Read on to make sure your Safety Data Sheets (SDSs) are compliant with OSHA's Hazard Communication Standard.

New chemicals used in an ever-widening variety of applications are continually being developed. Providing accurate, clear and concise information to people who use, handle or store hazardous chemicals is paramount.

On March 26, 2012, the Occupational Safety and Health Administration (OSHA) revised the Hazard Communication Standard, 29 Code of Federal Regulations (CFR) 1910.1200. The revision was effective 60 days thereafter (May 25, 2012), and a four-year phase-in period followed.

One of the most significant changes in the revised Standard was the adoption of portions of the Third Edition of the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS). This adoption provided a single set of harmonized criteria for classifying chemicals according to their health and physical hazards. The information required on the SDS, formerly referred to as a Material Safety Data Sheet (MSDS), remained essentially the same. However, the information on the SDS is now presented using 16 specific headings in a specified sequence. 29 CFR 1910.1200(g) provides the heading information to be included and the order in which they are to be provided. 29 CFR 1910.1200 Appendix D provides the information to be included under each heading. The SDS format is similar to the American National Standards Institute Z400.1/Z129.1-2010 Hazardous Workplace Chemicals – Hazard Evaluation and Safety Data Sheet and Precautionary Labeling Preparation Standard format.

Sections 1 through 8 of the SDS contain general information about the chemical, identification, hazards, composition, safe handling practices and emergency control measures. Sections 9 through 11 and 16 contain other technical and scientific information, such as physical and chemical properties, stability and reactivity information, toxicological information, exposure control information and other information including the date of preparation or last revision. The SDS must also contain Sections 12 through 15: ecological information, disposal considerations, transport information and other regulatory information, but OSHA does not enforce the content of these sections because they fall outside of its jurisdiction. A description of all 16 sections of the SDS, along with their contents, is given below:

Section 1: Identification

Identifies the chemical and the recommended uses. It also provides the supplier's essential contact information. Required information consists of:

- Product identifier used on the label and any other common names or synonyms by which the substance is known
- Name, address and phone number of the manufacturer, importer or other responsible party, and emergency phone number
- Recommended use of the chemical, a brief description of what it actually does and any restrictions on use

Section 2: Hazard(s) Identification

Identifies the hazards of the chemical and the appropriate warning information associated with those hazards. Required information consists of:

- Hazard classification of the chemical
- Signal word
- Hazard statement(s)
- Pictograms
- Precautionary statement(s)
- 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

Identifies the ingredient(s) contained in the product, including impurities and stabilizing additives. This section includes information on substances, mixtures and all chemicals where a trade secret is claimed. Required information consists of:

- 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 contribute to the classification of the chemical
- Mixtures
- Same information required for substances
- The chemical name and exact percentage of all ingredients that 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
    - The exact percentages of each ingredient must be specified, but concentration ranges may be used in the following situations:
        - A trade secret claim is made
        - There is batch-to-batch variation
        - The SDS is used for a group of substantially similar mixtures
        - 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

Provides guidance on the initial care that should be given by responders to an individual who has been exposed to the chemical. Required information consists of:

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

Section 5: Fire-Fighting Measures

Provides recommendations for fighting a fire caused by the chemical. Required information consists of:

- Recommendations of suitable extinguishing equipment
- Recommendations on special protective equipment or precautions for firefighters
- Advice on specific hazards that develop from the chemical during the fire; any hazardous combustion products created when the chemical burns
- Information about extinguishing equipment that is not appropriate for a particular situation

Section 6: Accidental Release Measures

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. Required information may consist of recommendations for:

- Use of precautions and protective equipment to prevent the contamination of skin, eyes and clothing
- Cleanup procedures/techniques
- Methods and materials used for containment
- Emergency procedures, including instructions for evacuations, consulting experts when needed and appropriate protective clothing

Section 7: Handling and Storage

Provides guidance on the safe handling practices and conditions for safe storage of chemicals. Required information consists of:

- 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 any incompatibilities

Section 8: Exposure Controls/Personal Protection

Provides guidance on the exposure limits, engineering controls and personal protective measures that can be used to minimize worker exposure. Required information consists of:

- 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, importer or employer preparing the safety data sheet, where available
- Recommendations for personal protective measures to prevent illness or injury from exposure to chemicals, such as personal protective equipment (PPE) and any special requirements for the PPE
- Appropriate engineering controls

Section 9: Physical and Chemical Properties

Identifies physical and chemical properties associated with the substance or mixture. Minimum required information consists of:

- Appearance (physical state, color, etc.)
- Viscosity
- Flammability (solid, gas)

- Decomposition temperature
- Evaporation rate
- Auto-ignition temperature
- Flash point
- Partition coefficient: n-octanol/water
- Initial boiling point and boiling range
- Solubility(ies)
- Melting point/freezing point
- Relative density
- pH
- Vapor density
- Odor threshold
- Vapor pressure
- Odor
- Upper/lower flammability or explosive limits

Every item listed above may not be relevant or available. When this occurs, a notation to that effect must be made for that property. Other relevant properties may be added.

Section 10: Stability and Reactivity

Describes the reactivity hazards of the chemical and the chemical stability information. Required information consists of:

- Reactivity
- List of any known or anticipated hazardous decomposition products that could be produced as a result of use, storage or heating
- List of all classes of incompatible materials with which the chemical could react to produce a hazardous situation
- List of all conditions that should be avoided
- Description of the conditions under which hazardous reactions may occur
- Indication of the possibility of hazardous reactions, including a statement as to whether the chemical will react or polymerize, which could release excess pressure or heat, or create other hazardous conditions
- Indication of any safety issues that may arise should the product change in physical appearance
- Description of any stabilizers that may be needed to maintain chemical stability
- Indication of whether the chemical is stable or unstable under normal ambient temperature and conditions while in storage and being handled
- Chemical stability
- 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), where available.

Section 11: Toxicological Information

Identifies toxicological and health effects information or indicates that such data are not available. Required information consists of:

- Information on the likely routes of exposure: inhalation, ingestion and/or skin and eye contact
- Indication of whether the chemical is listed in the National Toxicology Program (NTP) Report on Carcinogens or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs or found to be a potential carcinogen by OSHA
- This description includes the symptoms associated with exposure from the lowest to the most severe exposure
- Description of the symptoms
- The numerical measures of toxicity
- Description of the delayed, immediate or chronic effects from short- and long-

term exposure
- The SDS should indicate if the information is unknown

Section 12: Ecological Information (non-mandatory)

Provides guidance on the environmental impact of the chemical(s) if it were released to the environment. The information may include:

- Data from toxicity tests performed on aquatic and/or terrestrial organisms, where available
- Other adverse effects: environmental fate, ozone layer depletion potential, photochemical ozone creation potential, endocrine disrupting potential and/or global warming potential
- The potential for a substance to move from the soil to the groundwater
- Results of tests of bioaccumulation potential, making reference to the octanol-water partition coefficient and the bioconcentration factor where available
- 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 13: Disposal Considerations (non-mandatory)

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. The information may include:

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

Section 14: Transport Information (non-mandatory)

Provides guidance on classification information for shipping and transporting of hazardous materials by road, air, rail or sea. The information may include:

- UN number
- Any special precautions an employee should be aware of or needs to comply with, in connection with transport or conveyance either within or outside their premises
- Guidance on transport in bulk
- Environmental hazards
- Packing group number, if applicable, based on the degree of hazard
- Transport hazard class(es)
- UN proper shipping name

Section 15: Regulatory Information (non-mandatory)

Identifies any national and/or regional safety, health and environmental regulations specific for the product that are not indicated anywhere else on the SDS.

Section 16: Other Information

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. Other useful information also may be included here.

SDSs are the backbone of the Hazard Communication Standard. They provide comprehensive and specific chemical information used not only by workplaces that

manufacture, use, transport or store hazardous chemicals, but also by emergency responders, poison control centers and transporters of dangerous goods. The revised Hazard Communication Standard provides a single set of harmonized criteria for classifying chemicals and also stipulates specific hazard communication elements for SDSs and labeling, all in an effort to help improve the safety and health protections for America's workers.

Commonly Asked Questions

Q: What were the major changes to the revised Hazard Communication Standard?
A: There were three major areas of change in the revised Hazard Communication Standard:

- **Hazard classification:** The definitions of hazard were changed to provide specific criteria for classification of health and physical hazards, as well as classification of mixtures. These specific criteria help to ensure that evaluations of hazardous effects are consistent across manufacturers, and that labels and safety data sheets are more accurate as a results
- **Safety Data Sheets:** Now have a specified standard 16-section format.
- **Labels:** Chemical manufacturers and importers are required to provide a shipped container label that has six standardized elements: a product identifier, contact information, harmonized signal word, hazard pictogram(s), hazard statements for each hazard class and category and precautionary statements.

Q: The United Nations revises the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) every two years. Did OSHA anticipate needing future updates of the Hazard Communication Standard and how is OSHA communicating these changes?
A: OSHA did anticipate that future updates of the Hazard Communication Standard may be necessary and determined that they would be done through various rulemaking options, including:

- **Technical updates** for minor terminology changes
- **Notice and Comment rulemaking** for more substantive or controversial updates such as additional criteria or changes in health or safety hazard classes or categories
- **Direct Final Rules** for text clarification

Q: When must Safety Data Sheets be updated?
A: If the preparer of an SDS becomes aware of any significant new information regarding the hazards of the chemical or ways to protect against the hazards, then this new information must be added to the SDS within three months.

Resources:

American National Standards Institute Z400.1/Z129.1-2010 Hazardous Workplace Chemicals – Hazard Evaluation and Safety Data Sheet and Precautionary Labeling Preparation Standard

OSHA Quick Card on SDS

United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS) Third Edition – The Purple Book

OSHA Website – Hazard Communication

(Rev 7/2018)

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