

OSHA HAZCOM 2012 (GHS) TRAINING



November 2013

NOTICE

- This program outlines employer and employee responsibilities under OSHA's HAZCOM 2012 standard.
- This this program covers only the updated 2012 "GHS" additional requirements and *does not* cover the necessary training required by the *original* OSHA HAZCOM Standard 1910.1200.
- This training program satisfies the December 1, 2013 requirement.

INTRODUCTION

- **OSHA** (*Occupational Safety and Health Administration*) revised its Hazard Communication Standard (**HCS**) to align with the United Nation's **Globally Harmonized System** of Classification and Labeling of Chemicals (**GHS**) in March 2012.
- Significant revisions:
 - New **label elements**
 - Standardized format for **safety data sheets** (formally known as *material safety data sheets*)
 - Hazard classification

WHAT IS THE GLOBALLY HARMONIZED SYSTEM (GHS)?

- GHS stands for the **Globally Harmonized System** of classification and labeling of chemicals.
- GHS is a system that defines and classifies the hazards of chemical products and communicates health and safety information on **labels** and **Safety Data Sheets**.
- The target audiences at ZCS for GHS include custodial and maintenance staff, food service staff, mechanics and transportation staff, specific aquatic center and PAC employees as well as the secondary science departments.
- The goal of GHS is to harmonize the set of rules for classifying hazards, the format for chemical labeling, and the format of safety data sheets (SDS).

WHY IS GHS NECESSARY?

- Improve worker understanding of the hazards associated with chemicals in the workplace
 - Standardize and specify information
 - Ensure all suppliers of a chemical communicate hazards in the same way
- Currently, many different companies have different systems for the classification and labeling of hazardous chemicals that are used in the workplace.
 - These differences may cause confusion among employees when looking to a SDS for chemical information because not all current SDS and chemical labels look the same.
 - Under the GHS all SDSs will look the same and workers have the right to understand the dangers of chemicals they work with.

WHAT IS THE TARGET DATE FOR IMPLEMENTATION OF GHS?

Effective Completion Date	Requirement(s)	Who Must perform Requirements
December 1, 2013	Train employees on the new label elements, pictograms, and safety data sheet (SDS) format.	<u>Employers</u>
June 1, 2015 December 1, 2015	Compliance with all modified provisions of this final rule, except: The Distributor shall not ship containers labeled by the chemical manufacturer or importer unless it is a GHS label	Chemical manufacturers, importers, distributors and employers
June 1, 2016	Update alternative workplace labeling and hazard communication program as necessary and provide additional employee training for newly identified physical or health hazards.	<u>Employers</u>
Transition Period to the effective completion dates noted above	May comply with either 29 CFR 1910.1200 (the final standard), or the current standard, or both	Chemical manufacturers, importers, distributors, and employers

WHAT ARE SOME KEY TERMS IN THE GHS VOCABULARY?

- **SDS** - Safety Data Sheet. SDS is the term used by GHS for Material Safety Data Sheet (MSDS).
- **Hazard group** - While not given a formal definition, GHS divides hazards into three major groups - health, physical, and environmental.
- **Class** - Class is the term used to describe the different hazards. For example, "Gases under Pressure" is an example of a class in the physical hazards group.
- **Category** - Category is the name used to describe the subsections of classes. For example, Self-Reactive Chemicals have 7 categories. Each category has rules or criteria to determine what chemicals are assigned to that category.

WHAT ARE SOME KEY TERMS IN THE GHS VOCABULARY?

- **Hazard Statement** - For each category of hazard class, a standardized statement is used to describe the hazard. For example, the hazard statement for chemicals which meet the criteria for the class Self-heating substances and mixtures, Category 1 is "Self-Heating - May Catch Fire". This hazard statement would appear both on the label and on the SDS.
- **Signal word** - There are two signal words in the GHS system
 - “Warning” – Less Serious
 - “Danger” – **More** Serious
- **Pictogram** - Pictogram refers to the GHS symbol on the material label and SDS. Not all categories have a symbol associated with them.

HOW WILL GHS AFFECT ZIONSVILLE COMMUNITY SCHOOLS?

<i>Safety Data Sheets</i>	• The new SDS will be in a standardized 16 section format and provide additional information including ecological, disposal, transport, and regulatory information. • One of the key challenges will be working with vendors to update SDS inventory in a timely manner.
<i>Container Labeling</i>	• The GHS standard will become a requirement and replace current labeling systems. • The employer must ensure all containers are labeled properly. This includes GHS labels for original containers received from vendors and secondary containers.
<i>Training</i>	• Employees will need to be trained on label, SDS changes, updated product classifications, pictograms, signal words, and precautionary statements. • Written programs will also need updated to include changes to labeling, SDS communication and employee training. • OSHA has stated that employers will be required to train employees within 2 years of the publication of the final rule.

EMPLOYER RESPONSIBILITIES

- Employers must continue to:
 - Educate and train workers on the hazards and safe use of products
 - Ensure that hazardous materials are properly labeled
 - Prepare workplace labels and SDSs as necessary
 - Provide access for workers to up-to-date SDSs
 - Ensure appropriate control measures are in place to protect the health and safety of workers

EMPLOYEE RESPONSIBILITIES

- Employees will still:
 - Participate in HAZCOM and chemical safety training programs.
 - Take necessary steps to protect themselves and their coworkers.
 - Participate in identifying and controlling hazards.

LABEL ELEMENTS

- Labels are the immediate source of information on a chemical.
- New labels will have more information than current labels.
- There are certain types of information required to appear on labels.
- All suppliers have the same requirements, so labels should be more consistent in approach than current labels.
- There may also be additional information (known as supplemental information) on the label that is not required—the required information should be presented together on the label.
- Labels on shipped containers of hazardous chemicals will be changing by June 1, 2015.

NEW LABEL ELEMENTS

Label Element: specified pictogram(s), hazard statement(s), signal word and precautionary statement(s) for each hazard class and category.

SAMPLE LABEL

CODE _____ Product Name _____ Company Name _____ Street Address _____ City _____ State _____ Postal Code _____ Country _____ Emergency Phone Number _____	}	Product Identifier Supplier Identification	Hazard Pictograms  Signal Word Danger Highly flammable liquid and vapor. May cause liver and kidney damage. } Hazard Statements Precautionary Statements Supplemental Information Directions for Use _____ _____ _____ Fill weight: _____ Lot Number: _____ Gross weight: _____ Fill Date: _____ Expiration Date: _____
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Keep container tightly closed. Store in a cool, well-ventilated place that is locked.
Keep away from heat/sparks/open flame. No smoking.
Only use non-sparking tools.
Use explosion-proof electrical equipment.
Take precautionary measures against static discharge.
Ground and bond container and receiving equipment.
Do not breathe vapors.
Wear protective gloves.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.
Dispose of in accordance with local, regional, national, international regulations as specified.

In Case of Fire: use dry chemical (BC) or Carbon Dioxide (CO₂) fire extinguisher to extinguish.

First Aid
If exposed call Poison Center.
If on skin (or hair): Take off immediately any contaminated clothing. Rinse skin with water.

OSHA 3492-02 2012

LABEL ELEMENTS

- **Product Name or Identifier:** How hazardous chemical is identified. (ex: chemical name, code number or batch number) Same identifier must be both on label and in Section 1 of SDS (Identification).
- **Signal word:** One word used to indicate the relative severity of hazard and alert the reader to a potential hazard on the label and safety data sheet. The GHS includes two signal words:
 - “**Warning**” for less severe hazard
 - “**Danger**” for *more* severe hazard
- **Pictogram(s):** A black hazard symbol inside a square set at a point with a red frame, denoting a particular hazard class (e.g., acute toxicity/lethality, skin irritation/corrosion, etc.).

LABEL ELEMENTS

- **Hazard Statement(s):** Phrase assigned to each hazard category that describes the nature of the hazard. Examples of hazard statements are: “Harmful If Swallowed,” “Highly Flammable Liquid and Vapor” and “Harmful to Aquatic Life.”
 - Specific to the hazard classification categories
 - Address prevention, response, storage and disposal
- **Supplemental Information:** This information is meant to be additional / supplemental to the Hazard Statement Section when necessary.

LABEL ELEMENTS

- **Precautionary Measures and Pictograms:** Phrases that describe recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous product or aid in preventing improper storage or handling of a hazardous product. These phrases cover prevention, response, storage, and disposal of products.
- **First Aid Statement:** Description of necessary measures, subdivided according to the different routes of exposure (i.e. inhalation, skin and eye contact, and ingestion). Includes the most important acute and delayed symptoms/effects along with indication of immediate medical attention and special treatment needed.

LABEL ELEMENTS

- **Supplier identification:** Under the GHS supplier identification would include the name, address and telephone number of the chemical manufacturer, distributor or importer of the substance. Current EPA requirements for product identifiers are generally consistent with GHS.

Sample GHS Label

Product J (abc chemical)	Product Name or Identifier
	Pictogram
Danger	Signal Word
Fatal if swallowed Causes skin irritation	Hazard Statements
Precautions: Wear protective gloves. Take off contaminated clothing and wash before reuse. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product.	Precautionary Measures & Pictograms
Store locked up. Dispose of contents/containers in accordance with local regulations.	Supplemental Information
IF ON SKIN: Rinse skin with water/shower. IF IN EYES: Rinse cautiously with water. IF SWALLOWED: Immediately call a Poison Center or doctor/physician. Do not induce vomiting.	First Aid Statements
ABC Chemical Co., 123 Anywhere St., (123) 456-7890 See the SDS for more information	Supplier Identification

SAMPLE GHS LABEL

Single packaging using 3 adjacent panels to convey multiple hazards.

Product classified as: (a) Category 2 Flammable liquid; (b) Category Acute 4 (by inhalation); and (c) Category 2 Specific target organ toxicant following repeated exposure.

CODE

PRODUCT NAME

COMPANY NAME

Street Address
City, State, Postal Code, Country
Phone Number
Emergency Phone Number

DIRECTIONS FOR USE:

XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX

Fill weight: XXXX Lot Number: XXXX
Gross weight: XXXX Fill Date: XXXX
Expiration Date: XXXX



Danger

Keep out of the reach of children.
Read label before use.



Highly flammable liquid and vapour.
Harmful if inhaled.
May cause liver and kidney damage through
prolonged or repeated exposure.

Keep container tightly closed.
Keep away from heat/sparks/open flame. -No smoking.
Use only outdoors or in a well-ventilated area.
Do not breathe fume/gas/mist/vapours/spray.
Wear protective gloves and eye/face protection [as specified....]
Ground/bond container and receiving equipment.

IN CASE OF FIRE use [as specified] for extinction

FIRST AID

IF INHALED: Remove to fresh air and keep at rest in
a position comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.

Store in a cool, well-ventilated place.

Product Name or Identifier

Pictogram

Signal Word

Hazard Statements

Precautionary Measures &
Pictograms

First Aid Statements

Supplemental Information

Supplier Identification

ADDITIONAL LABEL ELEMENT FACTS

- How to use information found on the labels in the workplace
 - Properly store hazardous chemicals
 - Quickly locate information on first aid when needed by employees or emergency personnel
- General understanding of how elements work together on a label
 - A chemical with multiple hazards will have different pictograms to identify the various hazards.
 - Employee should expect to see appropriate pictogram for hazard class
 - The most protective precautionary statement will be included on the label when there are multiple.

HAZARD CLASSIFICATION

- **Classification (health hazards)**
 - acute toxicity
 - skin corrosion/irritation
 - serious eye damage/eye irritation
 - respiratory or skin sensitization
 - germ cell mutagenicity
 - carcinogenicity
 - reproductive toxicity
 - specific target organ toxicity - single exposure
 - specific target organ toxicity - repeated exposure
 - aspiration hazard

HAZARD CLASSIFICATION

○ **Classification (physical hazards)**

- explosives
- flammable gases
- aerosols
- oxidizing gases
- gases under pressure
- flammable liquids
- flammable solids
- oxidizing liquids
- oxidizing solids
- corrosive to metals

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 (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non-Mandatory)

HCS PICTOGRAMS AND HAZARDS

Gas Cylinder  • Gases Under Pressure	Corrosion  • Skin Corrosion/ Burns • Eye Damage • Corrosive to Metals	Exploding Bomb  • Explosives • Self-Reactives • Organic Peroxides
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HCS PICTOGRAMS AND HAZARDS

Flame Over Circle  • Oxidizers	Environment (Non-Mandatory)  • Aquatic Toxicity	Skull and Crossbones  • Acute Toxicity (fatal or toxic)
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EXAMPLE OF A HAZARD CLASS W/CATEGORIES (APPENDIX A: A.1): ACUTE TOXICITY

Exposure route	Category 1	Category 2	Category 3	Category 4
Oral (mg/kg bodyweight) <u>see:</u> Note (a) Note (b)	≤ 5	>5 and ≤ 50	>50 and ≤ 300	>300 and ≤ 2000
Dermal (mg/kg bodyweight) <u>see:</u> Note (a) Note (b)	≤ 50	>50 and ≤ 200	>200 and ≤ 1000	>1000 and ≤ 2000
Inhalation - Gases (ppmV) <u>see:</u> Note (a) Note (b) Note (c)	≤ 100	>100 and ≤ 500	>500 and ≤ 2500	>2500 and ≤ 20000
Inhalation - Vapors (mg/l) <u>see:</u> Note (a) Note (b) Note (c) Note (d)	≤ 0.5	>0.5 and ≤ 2.0	>2.0 and ≤ 10.0	>10.0 and ≤ 20.0
Inhalation – Dusts and Mists (mg/l) <u>see:</u> Note (a) Note (b) Note (c)	≤ 0.05	>0.05 and ≤ 0.5	>0.5 and ≤ 1.0	>1.0 and ≤ 5.0

SAFETY DATA SHEETS (SDS)

SDS: detailed source of information about the chemical for a variety of audiences; reference to ensure chemical is handled safely.

- **The old MSDS (Material Safety Data Sheets) will now be called SDS (Safety Data Sheets).**
- The new GHS Safety Data Sheet (SDS) has 16 sections in a set order (regardless of supplier) and regulated information requirements as shown below.
- Most important information are listed in the first sections.
- All old MSDS inventories will need to be updated to current SDS.
- Employers will now be required to update SDS inventory every three (3) years.
- **NOTE: The precautionary statements will be the same on the label as they are on the SDS.**

SAFETY DATA SHEETS (SDS)

- SDSs must be readily accessible to workers when they are in their work areas, during each work shift.
- Hazard communication works when employers also use SDS information to make sure that proper protective measures are being implemented.

Safety Data Sheet (SDS) Sections 1-16

- | | |
|---|--|
| 1) Identification of the substance or mixture and of the supplier | 9) Physical and chemical properties |
| 2) Hazards identification | 10) Stability and reactivity |
| 3) Composition/information on ingredients | 11) Toxicological information |
| 4) First aid measures | 12) Ecological information |
| 5) Firefighting measures | 13) Disposal considerations |
| 6) Accidental release measures | 14) Transport information |
| 7) Handling and storage | 15) Regulatory information |
| 8) Exposure controls/personal protection | 16) Other information including information on preparation and revision of the SDS |

SAFETY DATA SHEETS (SDS)

NFPA: Flammability



Example of New Format SDS

NFPA 704 Placard & Ratings Voluntarily Provided

GHS System and Labels Down in Section 2

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Product XYZ

Synonyms :

SDS Number : 888100008809 Version : 1.1

Product Use Description : Fuel

Company :

Chemtrec : (800) 424-9300
(Emergency Contact)

SECTION 2. HAZARDS IDENTIFICATION

Classifications : Flammable Liquid – Category 1 or 2 depending on formulation.
Aspiration Hazard – Category 1
Carcinogenicity – Category 2
Specific Target Organ Toxicity (Repeated Exposure) – Category 2
Specific Target Organ Toxicity (Single Exposure) – Category 3
Skin Irritation – Category 2
Eye Irritation – Category 2B
Chronic Aquatic Toxicity – Category 2

Pictograms :



Signal Word : Danger

SAFETY DATA SHEETS (SDS)

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. The 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, phone number of the manufacturer, importer, or other responsible party, and emergency phone number.
- Recommended use of the chemical (e.g., a brief description of what it actually does, such as flame retardant) and any restrictions on use (including recommendations given by the supplier).

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. The required information consists of:

- The hazard classification of the chemical (e.g., flammable liquid, category¹).
- Signal word.
- Hazard statement(s).
- Pictograms (the pictograms or hazard symbols may be presented as graphical reproductions of the symbols in black and white or be a description of the name of the symbol (e.g., skull and crossbones, flame).
- 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. Please note that this is a total percentage of the mixture and not tied to the individual ingredient(s).

SAFETY DATA SHEETS (SDS)

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. The 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 which contribute to the classification of the chemical.

Mixtures

- Same information required for substances.
- The chemical name and concentration (i.e., 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.
- 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.

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.

SAFETY DATA SHEETS (SDS)

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. The required information consists of:

- 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. The required information consists of:

- 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.

SAFETY DATA SHEETS (SDS)

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. The required information may consist of recommendations for:

- Use of personal precautions (such as removal of ignition sources or providing sufficient ventilation) and protective equipment to prevent the contamination of skin, eyes, and clothing.
- Emergency procedures, including instructions for evacuations, consulting experts when needed, and appropriate protective clothing.
- Methods and materials used for containment (e.g., covering the drains and capping procedures).
- Cleanup procedures (e.g., appropriate techniques for neutralization, decontamination, cleaning or vacuuming; adsorbent materials; and/or 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. The 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 (e.g., eating, drinking, and smoking in work areas is prohibited).
- Recommendations on the conditions for safe storage, including any incompatibilities. Provide advice on specific storage requirements (e.g., ventilation requirements).

SAFETY DATA SHEETS (SDS)

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. The 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.
- Appropriate engineering controls (e.g., use local exhaust ventilation, or use only in an enclosed system).
- Recommendations for personal protective measures to prevent illness or injury from exposure to chemicals, such as personal protective equipment (PPE) (e.g., 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 (e.g., type of glove material, such as PVC or nitrile rubber gloves; and breakthrough time of the glove material).

SAFETY DATA SHEETS (SDS)

Section 9: Physical and Chemical Properties

This section identifies physical and chemical properties associated with the substance or mixture. The minimum required information consists of:

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

The SDS may not contain every item on the above list because information may not be relevant or is not available. When this occurs, a notation to that effect must be made for that chemical property. Manufacturers may also add other relevant properties, such as the dust deflagration index (Kst) for combustible dust, used to evaluate a dust's explosive potential.

SAFETY DATA SHEETS (SDS)

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, and other. The required information consists of:

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), where available.

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.

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. Also, a description of the conditions under which hazardous reactions may occur.
- List of all conditions that should be avoided (e.g., static discharge, shock, vibrations, or environmental conditions that may lead to hazardous conditions).
- List of all classes of incompatible materials (e.g., classes of chemicals or specific substances) with which the chemical could react to produce a hazardous situation.
- 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.)

SAFETY DATA SHEETS (SDS)

Section 11: Toxicological Information

This section identifies toxicological and health effects information or indicates that such data are not available. The required information consists of:

- 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 (e.g., acute toxicity estimates such as the LD50 (median lethal dose)) - the estimated amount [of a substance] expected to kill 50% of test animals in a single dose.
- 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.

SAFETY DATA SHEETS (SDS)

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. The information may include:

- Data from toxicity tests performed on aquatic and/or terrestrial organisms, where available (e.g., acute or chronic aquatic toxicity data for fish, algae, crustaceans, and other plants; toxicity data on birds, bees, 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.
- Results of tests of bioaccumulation potential, making reference to the octanol-water partition coefficient (K_{ow}) and the bioconcentration factor (BCF), where available.
- The potential for a substance to move from the soil to the groundwater (indicate results from adsorption studies or leaching studies).
- Other adverse effects (e.g., environmental fate, ozone layer depletion potential, photochemical ozone creation potential, endocrine disrupting potential, and/or global warming potential).

SAFETY DATA SHEETS (SDS)

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. The 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. The information may include:

- UN number (i.e., four-figure identification number of the substance)².
- UN proper shipping name².
- Transport hazard class(es)².
- Packing group number, if applicable, based on the degree of hazard².
- Environmental hazards (e.g., identify if it is a marine pollutant according to the International Maritime Dangerous Goods Code (IMDG Code)).
- Guidance on transport in bulk (according to Annex II of MARPOL 73/78³ and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (International Bulk Chemical Code (IBC 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 (indicate when information is not available).

SAFETY DATA SHEETS (SDS)

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. The 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. You may wish to contact the supplier for an explanation of the changes. Other useful information also may be included here.

ADDITIONAL RESOURCES

HazCom 2012 Webpage

<http://www.osha.gov/dsg/hazcom/index.html>

Safety & Health Topics Webpage

<http://www.osha.gov/dsg/hazcom/index2.html>

UN GHS Sub-Committee Home Page

http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html

Questions?

