



## **Summary of OSHA's GHS Revisions to the Hazard Communication Standard**

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On March 20, 2012, OSHA issued a final rule that substantially modifies its Hazard Communication Standard (HCS) to conform to the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

The modifications to the HCS include:

- Revised criteria for classification of chemical hazards;
- Revised labeling provisions that include requirements for use of standardized signal words, pictograms, hazard statements, and precautionary statements;
- A specified format for safety data sheets;
- Related revisions to definitions of terms used in the standard; and
- Requirements for employee training on labels and safety data sheets.

OSHA is also modifying provisions of other standards, including standards for flammable and combustible liquids, process safety management, and most substance-specific health standards, to ensure consistency with the modified HCS requirements.

The information below provides a detailed summary of OSHA's final rule that makes GHS revisions to the HCS.

### **Summary of GHS Revisions to the Hazard Communication Standard**

#### ***Definitions:***

The following new or revised definitions have been added to the HCS.

"Classification" means to identify the relevant data regarding the hazards of a chemical; review those data to ascertain the hazards associated with the chemical; and decide whether the chemical will be classified as hazardous according to the definition of hazardous chemical in this section. In addition, classification for health and physical hazards includes the determination of the degree of hazard, where appropriate, by comparing the data with the criteria for health and physical hazards.

"Hazard category" means the division of criteria within each hazard class, e.g., oral acute toxicity and flammable liquids include four hazard categories. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally.

"Hazard class" means the nature of the physical or health hazards, e.g., flammable solid, carcinogen, oral acute toxicity.

"Hazard not otherwise classified (HNOC)" means an adverse physical or health effect identified through evaluation of scientific evidence during the classification process that does not meet the specified criteria for the physical and health hazard classes addressed in this section. This does not extend coverage to adverse physical and health effects for which there is a hazard class addressed in this section, but the effect either falls below the cut-off value/concentration limit of the hazard class or is under a GHS hazard category that has not been adopted by OSHA (e.g., acute toxicity Category 5).

"Hazard statement" means a statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard.

"Hazardous chemical" means any chemical which is classified as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified.

"Health hazard" means a chemical which is classified as posing one of the following hazardous effects: acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); or aspiration hazard. The criteria for determining whether a chemical is classified as a health hazard are detailed in mandatory Appendix A to §1910.1200 -- Health Hazard Criteria.

"Physical hazard" means a chemical that is classified as posing one of the following hazardous effects: explosive; flammable (gases, aerosols, liquids, or solids); oxidizer (liquid, solid or gas); self-reactive; pyrophoric (liquid or solid); self-heating; organic peroxide; corrosive to metal; gas under pressure; or in contact with water emits flammable gas. See mandatory Appendix B to §1910.1200 -- Physical Hazard Criteria.

"Pictogram" means a composition that may include a symbol plus other graphic elements, such as a border, background pattern, or color, that is intended to convey specific information about the hazards of a chemical. Eight pictograms are designated under this standard for application to a hazard category.

"Precautionary statement" means a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling.

"Product identifier" means the name or number used for a hazardous chemical on a label or in the SDS. It provides a unique means by which the user can identify the chemical. The product identifier used shall permit cross-references to be made among the list of hazardous chemicals required in the written hazard communication program, the label and the SDS.

"Substance" means chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

### ***Hazard Classification:***

The hazard classification approach in the GHS is quite different from the performance-oriented approach in the old HCS. The GHS has specific criteria for each health and physical hazard, along with detailed instructions for hazard evaluation and determinations as to whether mixtures of the substance are covered. OSHA has included the general provisions for hazard classification in paragraph (d) of the revised rule, and added extensive appendixes that address the criteria for each health or physical effect.

Mandatory Appendices A and B provide classification guidance for Health Hazards and Physical Hazards, respectively. The hazard classification criteria contained in the HCS 2012 is test method-neutral. That is, the person classifying a chemical or substance should use available data and no additional testing is required to classify a chemical.

(d)(1) Chemical manufacturers and importers shall evaluate chemicals produced in their workplaces or imported by them to classify the chemicals in accordance with this section. For each chemical, the chemical manufacturer or importer shall determine the hazard classes, and where appropriate, the category of each class that apply to the chemical being classified. Employers are not required to classify chemicals unless they choose not to rely on the classification performed by the chemical manufacturer or importer for the chemical to satisfy this requirement.

(d)(2) Chemical manufacturers, importers or employers classifying chemicals shall identify and consider the full range of available scientific literature and other evidence concerning the potential hazards. There is no requirement to test the chemical to determine how to classify its hazards. Appendix A to §1910.1200 shall be consulted for classification of health hazards, and Appendix B to §1910.1200 shall be consulted for the classification of physical hazards.

(d)(3) Mixtures.

(d)(3)(i) Chemical manufacturers, importers, or employers evaluating chemicals shall follow the procedures described in Appendices A and B to §1910.1200 to classify the hazards of the chemicals, including determinations regarding when mixtures of the classified chemicals are covered by this section.

(d)(3)(ii) When classifying mixtures they produce or import, chemical manufacturers and importers of mixtures may rely on the information provided on the current safety data sheets of the individual ingredients except where the chemical manufacturer or importer knows, or in the exercise of reasonable diligence should know, that the safety data sheet misstates or omits information required by this section.

***Labels:***

This paragraph has been extensively re-written. While, the old HCS had a simple and performance-oriented approach to labels, this final rule sets forth detailed and specific provisions for labeling. Additionally, a new mandatory Appendix C indicates what specific information must be provided on the label for each hazard class and category once a chemical is classified.

Under this revised paragraph; chemical manufacturers and importers must provide a label that includes: the product identifier, supplier information which is to include name, address and phone number of manufacturer, importer or distributor; and the signal word, pictogram, and hazard statement for each hazard class and category. Precautionary statements must also be provided. The old HCS does not require the use of pictograms, specific signal words, or precautionary statements.

(f)(1) Labels on shipped containers. The chemical manufacturer, importer, or distributor shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged or marked. Hazards not otherwise classified do not have to be addressed on the container. Where the chemical manufacturer or importer is required to label, tag or mark the following information shall be provided:

- (f)(1)(i) Product identifier;
- (f)(1)(ii) Signal word;
- (f)(1)(iii) Hazard statement(s);
- (f)(1)(iv) Pictogram(s);
- (f)(1)(v) Precautionary statement(s); and,
- (f)(1)(vi) Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party.

(f)(2) The chemical manufacturer, importer, or distributor shall ensure that the information provided under paragraphs (f)(1)(i) through (v) of this section is in accordance with Appendix C to §1910.1200, for each hazard class and associated hazard category for the hazardous chemical, prominently displayed, and in English (other languages may also be included if appropriate).

(f)(3) The chemical manufacturer, importer, or distributor shall ensure that the information provided under paragraphs (f)(1)(ii) through (iv) of this section is located together on the tag, label or mark.

(f)(6) Workplace labeling. Except as provided in paragraphs (f)(7) and (f)(8) of this section, the employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with either:

(f)(6)(i) The information specified under paragraphs (f)(1)(i) through (v) of this section for labels on shipped containers; or,

(f)(6)(ii) Product identifier and words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which, in conjunction with the other information immediately available to employees under the hazard communication program, will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.

(f)(7) The employer may use signs, placards, process sheets, batch tickets, operating procedures, or other such written materials in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it is applicable and conveys the information required by paragraph (f)(6) of this section to be on a label. The employer shall ensure the written materials are readily accessible to the employees in their work area throughout each work shift.

***Safety Data Sheets:***

Safety Data Sheets, previously referred to as Material Safety Data Sheets, will now require a 16-section format that is essentially the same as the ANSI standard for *Hazardous Workplace Chemicals-Hazard Evaluation and Safety Data Sheets and Precautionary Labeling Preparation* (ANSI Z400.1 & Z129.1 - 2010), already familiar to U.S. employers. Paragraph (g) lists the sections in the order they are to be provided on the Safety Data Sheets.

This paragraph is supplemented by new mandatory Appendix D, which details the information to be included under each heading. The old HCS requires similar information, but allows any format to be used. This final rule is designed more in-line with the GHS, which has a uniform approach. This uniformity will improve the effectiveness of the safety data sheet, as well as make it easier for employers to comply.

(g)(1) Chemical manufacturers and importers shall obtain or develop a safety data sheet for each hazardous chemical and for each chemical they produce or import. Employers shall have a safety data sheet in the workplace for each hazardous chemical which they use.

(g)(2) The chemical manufacturer or importer preparing the safety data sheet shall ensure that it is in English (although the employer may maintain copies in other languages as well), and includes at least the following section numbers and headings, and associated information under each heading, in the order listed (See Appendix D to §1910.1200--Safety Data Sheets, for the specific content of each section of the safety data sheet):

- (i) Section 1, Identification;
- (ii) Section 2, Hazard(s) identification;
- (iii) Section 3, Composition/information on ingredients;
- (iv) Section 4, First-aid measures;
- (v) Section 5, Fire-fighting measures;
- (vi) Section 6, Accidental release measures;

- (vii) Section 7, Handling and storage;
- (viii) Section 8, Exposure controls/personal protection;
- (ix) Section 9, Physical and chemical properties;
- (x) Section 10, Stability and reactivity;
- (xi) Section 11, Toxicological information.
- (xii) Section 12, Ecological information;
- (xiii) Section 13, Disposal considerations;
- (xiv) Section 14, Transport information;
- (xv) Section 15, Regulatory information; and
- (xvi) Section 16, Other information, including date of preparation or last revision.

Note 1 to paragraph (g)(2): To be consistent with the GHS, an SDS must also include the headings in paragraphs (g)(2)(xii) through (g)(2)(xv) in order.

Note 2 to paragraph (g)(2): OSHA will not be enforcing information requirements in sections 12 through 15, as these areas are not under its jurisdiction.

### ***Employee Information and Training:***

The provisions in paragraph (h) indicate that the new label, safety data sheet formats and presentation of information must be discussed in training. All employers will be required to conduct additional training to ensure that their employees are familiar with the new standardized labels and safety data sheets. Otherwise, the training provisions remain the same as in the old HCS.

(h)(1) Employers shall provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new chemical hazard the employees have not previously been trained about is introduced into their work area. Information and training may be designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical-specific information must always be available through labels and safety data sheets.

(h)(2) Information. Employees shall be informed of:

- (h)(2)(i) The requirements of this section;
- (h)(2)(ii) Any operations in their work area where hazardous chemicals are present; and,
- (h)(2)(iii) The location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and safety data sheets required by this section.

(h)(3) Training. Employee training shall include at least:

- (h)(3)(i) Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);

(h)(3)(ii) The physical, health, simple asphyxiation, combustible dust and pyrophoric gas hazards, as well as hazards not otherwise classified, of the chemicals in the work area;

(h)(3)(iii) The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and,

(h)(3)(iv) The details of the hazard communication program developed by the employer, including an explanation of the labels received on shipped containers and the workplace labeling system used by their employer; the safety data sheet, including the order of information and how employees can obtain and use the appropriate hazard information.

***Trade secrets:***

The trade secret provisions of the GHS are consistent with the old HCS and therefore only a few changes were made to this section. The GHS, unlike the old HCS, requires disclosure of the percentage composition of mixtures on the SDS. This final rule adopts this requirement, but allows the manufacturer to claim trade secret protection for this requirement. This is the only substantive change to the existing standard's trade secret protections.

(i)(1) The chemical manufacturer, importer, or employer may withhold the specific chemical identity, including the chemical name, other specific identification of a hazardous chemical, or the exact percentage (concentration) of the substance in a mixture, from the safety data sheet, provided that:

(i)(1)(i) The claim that the information withheld is a trade secret can be supported;

(i)(1)(ii) Information contained in the safety data sheet concerning the properties and effects of the hazardous chemical is disclosed;

(i)(1)(iii) The safety data sheet indicates that the specific chemical identity and/or percentage of composition is being withheld as a trade secret; and,

(i)(1)(iv) The specific chemical identity and percentage is made available to health professionals, employees, and designated representatives in accordance with the applicable provisions of this paragraph (i).

(i)(2) Where a treating physician or nurse determines that a medical emergency exists and the specific chemical identity and/or specific percentage of composition of a hazardous chemical is necessary for emergency or first-aid treatment, the chemical manufacturer, importer, or employer shall immediately disclose the specific chemical identity or percentage composition of a trade secret chemical to that treating physician or nurse, regardless of the existence of a written statement of need or a confidentiality agreement. The chemical manufacturer, importer, or employer may require a written statement of need and confidentiality agreement, in accordance with the provisions of paragraphs (i)(3) and (4) of this section, as soon as circumstances permit.

(i)(3) In non-emergency situations, a chemical manufacturer, importer, or employer shall, upon request, disclose a specific chemical identity or percentage composition, otherwise permitted to be withheld under paragraph (i)(1) of this section, to a health professional (i.e. physician, industrial hygienist, toxicologist, epidemiologist, or occupational health nurse) providing medical or other occupational health services to exposed employee(s), and to employees or designated representatives, if:

(i)(3)(i) The request is in writing;

(i)(3)(ii) The request describes with reasonable detail one or more of the following occupational health needs for the information:

(i)(3)(ii)(A) To assess the hazards of the chemicals to which employees will be exposed;

(i)(3)(ii)(B) To conduct or assess sampling of the workplace atmosphere to determine employee exposure levels;

(i)(3)(ii)(C) To conduct pre-assignment or periodic medical surveillance of exposed employees;

(i)(3)(ii)(D) To provide medical treatment to exposed employees;

(i)(3)(ii)(E) To select or assess appropriate personal protective equipment for exposed employees;

(i)(3)(ii)(F) To design or assess engineering controls or other protective measures for exposed employees; and,

(i)(3)(ii)(G) To conduct studies to determine the health effects of exposure.

(i)(3)(iii) The request explains in detail why the disclosure of the specific chemical identity or percentage composition is essential and that, in lieu thereof, the disclosure of the following information to the health professional, employee, or designated representative, would not satisfy the purposes described in paragraph (i)(3)(ii) of this section:

(i)(3)(iii)(A) The properties and effects of the chemical;

(i)(3)(iii)(B) Measures for controlling workers' exposure to the chemical;

(i)(3)(iii)(C) Methods of monitoring and analyzing worker exposure to the chemical; and,

(i)(3)(iii)(D) Methods of diagnosing and treating harmful exposures to the chemical.



(i)(3)(iii)(iv) The request includes a description of the procedures to be used to maintain the confidentiality of the disclosed information; and,

(i)(3)(iii)(v) The health professional, and the employer or contractor of the services of the health professional (i.e. downstream employer, labor organization, or individual employee), employee, or designated representative, agree in a written confidentiality agreement that the health professional, employee, or designated representative, will not use the trade secret information for any purpose other than the health need(s) asserted and agree not to release the information under any circumstances other than to OSHA, as provided in paragraph (i)(6) of this section, except as authorized by the terms of the agreement or by the chemical manufacturer, importer, or employer.

(i)(4) The confidentiality agreement authorized by paragraph (i)(3)(iv) of this section:

(i)(4)(i) May restrict the use of the information to the health purposes indicated in the written statement of need;

(i)(4)(ii) May provide for appropriate legal remedies in the event of a breach of the agreement, including stipulation of a reasonable pre-estimate of likely damages; and,

(i)(4)(iii) May not include requirements for the posting of a penalty bond.

(i)(5) Nothing in this standard is meant to preclude the parties from pursuing non-contractual remedies to the extent permitted by law.

(i)(6) If the health professional, employee, or designated representative receiving the trade secret information decides that there is a need to disclose it to OSHA, the chemical manufacturer, importer, or employer who provided the information shall be informed by the health professional, employee, or designated representative prior to, or at the same time as, such disclosure.

(i)(7) If the chemical manufacturer, importer, or employer denies a written request for disclosure of a specific chemical identity or percentage composition, the denial must:

(i)(7)(i) Be provided to the health professional, employee, or designated representative, within thirty days of the request;

(i)(7)(ii) Be in writing;

(i)(7)(iii) Include evidence to support the claim that the specific chemical identity or percent of composition is a trade secret;

(i)(7)(iv) State the specific reasons why the request is being denied; and,

(i)(7)(v) Explain in detail how alternative information may satisfy the specific medical or occupational health need without revealing the trade secret.

(i)(8) The health professional, employee, or designated representative whose request for information is denied under paragraph (i)(3) of this section may refer the request and the written denial of the request to OSHA for consideration.

(i)(9) When a health professional, employee, or designated representative refers the denial to OSHA under paragraph (i)(8) of this section, OSHA shall consider the evidence to determine if:

(i)(9)(i) The chemical manufacturer, importer, or employer has supported the claim that the specific chemical identity or percentage composition is a trade secret;

(i)(9)(ii) The health professional, employee, or designated representative has supported the claim that there is a medical or occupational health need for the information; and,

(i)(9)(iii) The health professional, employee or designated representative has demonstrated adequate means to protect the confidentiality.

(i)(10)(i) If OSHA determines that the specific chemical identity or percentage composition requested under paragraph (i)(3) of this section is not a "bona fide" trade secret, or that it is a trade secret, but the requesting health professional, employee, or designated representative has a legitimate medical or occupational health need for the information, has executed a written confidentiality agreement, and has shown adequate means to protect the confidentiality of the information, the chemical manufacturer, importer, or employer will be subject to citation by OSHA.

(i)(11) If a citation for a failure to release trade secret information is contested by the chemical manufacturer, importer, or employer, the matter will be adjudicated before the Occupational Safety and Health Review Commission in accordance with the Act's enforcement scheme and the applicable Commission rules of procedure. In accordance with the Commission rules, when a chemical manufacturer, importer, or employer continues to withhold the information during the contest, the Administrative Law Judge may review the citation and supporting documentation "in camera" or issue appropriate orders to protect the confidentiality of such matters.

(i)(12) Notwithstanding the existence of a trade secret claim, a chemical manufacturer, importer, or employer shall, upon request, disclose to the Assistant Secretary any information which this section requires the chemical manufacturer, importer, or employer to make available. Where there is a trade secret claim, such claim shall be made no later than at the time the information is provided to the Assistant Secretary so that suitable determinations of trade secret status can be made and the necessary protections can be implemented.

(i)(13) Nothing in this paragraph shall be construed as requiring the disclosure under any circumstances of process information which is a trade secret.

***Effective Dates:***

OSHA's final rule requires employers to train employees on the new label elements and safety data sheet format by December 1, 2013. All other provisions are to be in effect by June 1, 2015, with two exceptions. First, distributors will be given an extra six months (December 1, 2015) to ensure all manufacturer labels are updated. Second, all employers will have an additional year (June 1, 2016) to ensure that updated workplace signs, hazard communication program, and auxiliary training necessary for newly identified physical or health hazards, as provided in (h)(1), are in place.

(j)(1) Employers shall train employees regarding the new label elements and safety data sheets format by December 1, 2013.

(j)(2) Chemical manufacturers, importers, distributors, and employers shall be in compliance with all modified provisions of this section no later than June 1, 2015, except:

(j)(2)(i) After December 1, 2015, the distributor shall not ship containers labeled by the chemical manufacturer or importer unless the label has been modified to comply with paragraph (f)(1) of this section.

(j)(2)(ii) All employers shall, as necessary, update any alternative workplace labeling used under paragraph (f)(6) of this section, update the hazard communication program required by paragraph (h)(1), and provide any additional employee training in accordance with paragraph (h)(3) for newly identified physical or health hazards no later than June 1, 2016.

(j)(3) Chemical manufacturers, importers, distributors, and employers may comply with either §1910.1200, revised as of October 1, 2011, or the current version of this standard or both during the transition period.

***Conclusion:***

The GHS revisions to the OSHA HCS are substantial and will take time to implement. In the meantime, ISSA will be preparing educational and compliance materials in the coming months to help manufacturers, distributors, and cleaning service providers comply with the new requirements. In the meantime, we encourage you to review the Appendices below that set forth additional information related to the pictograms and new Safety Data Sheet requirements.

## Appendix: HCS/GHS Pictograms and Hazards

### Health Hazard



Carcinogen  
Mutagenicity  
Reproductive Toxicity  
Respiratory Sensitizer  
Target Organ Toxicity  
Aspiration Toxicity

### Flame



Flammables  
Pyrophorics  
Self-Heating  
Emits Flammable Gas  
Self-Reactives  
Organic Peroxides

### Exclamation Mark



Irritant (skin and eye)  
Skin Sensitizer  
Acute Toxicity  
Narcotic Effects  
Respiratory Tract Irritant  
Hazardous to Ozone  
Layer (Non-Mandatory)

### Gas Cylinder



Gases Under Pressure

### Corrosion



Skin Corrosion/Burns  
Eye Damage  
Corrosive to Metals

### Exploding Bomb



Explosives  
Self-Reactives  
Organic Peroxides

### Flame Over Circle



Oxidizers

### Environment (Non-Mandatory)



Aquatic Toxicity

### Skull and Crossbones



Acute Toxicity (fatal or toxic)

## Appendix: Safety Data Sheets

**Section 1. Identification:** The requirements in this section are not new except for format and the requirement to list recommended uses and restrictions on use.

### Identification

- Product identifier used on the label;
- Other means of identification;
- Recommended use of the chemical and restrictions on use;
- Name, address, and telephone number of the manufacturer, importer, or other responsible party;
- Emergency phone number.

**Section 2. Hazard(s) identification:** In this section, the employer must identify the hazards according to the new classification criteria in Appendices A and B. Pictograms, standardized hazard statements, signal words, and precautionary statements are now required.

### Hazard(s) identification

- Classification of the chemical in accordance with paragraph (d) of §1910.1200;
- Signal word, hazard statement(s), symbol(s) and precautionary statement(s) in accordance with paragraph (f) of §1910.1200. (Hazard symbols may be provided as graphical reproductions in black and white or the name of the symbol, e.g., flame, skull and crossbones);
- Describe any hazards not otherwise classified that have been identified during the classification process;
- Where an ingredient with unknown acute toxicity is used in a mixture at a concentration  $\geq 1\%$  and the mixture is not classified based on testing of the mixture as a whole, a statement that X% of the mixture consists of ingredient(s) of unknown acute toxicity is required.

**Section 3. Composition/information on ingredients.** This section contains no new requirements other than format.

### For Substances

- Chemical name;
- Common name and synonyms;
- CAS number and other unique identifiers;
- Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance.

## For Mixtures

In addition to the information required for substances:

- The chemical name and concentration (exact percentage) or concentration ranges of all ingredients which are classified as health hazards in accordance with paragraph (d) of §1910.1200 and
  - are present above their cut-off/concentration limits; or
  - present a health risk below the cut-off/concentration limits.
- The concentration (exact percentage) shall be specified unless a trade secret claim is made in accordance with §1910.1200(i), when there is batch-to-batch variability in the production of a mixture, or for a group of substantially similar mixtures (*See* A.0.5.1.2) with similar chemical composition. In these cases, concentration ranges may be used.

## For All Chemicals Where a Trade Secret is Claimed

Where a trade secret is claimed in accordance with paragraph (i) of §1910.1200, a statement that the specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret is required.

**Section 4. First-aid measures.** This section contains no new requirements other than format.

- Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact, and ingestion;
- Most important symptoms/effects, acute and delayed.
- Indication of immediate medical attention and special treatment needed, if necessary.

**Section 5. Fire-fighting measures.** This section contains no new requirements other than format.

- Suitable (and unsuitable) extinguishing media.
- Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products).

**Section 6. Accidental release measures.** This section contains no new requirements other than format.

- Personal precautions, protective equipment, and emergency procedures.
- Methods and materials for containment and cleaning up.

**Section 7. Handling and storage.** This section contains no new requirements other than format.

- Precautions for safe handling.

**Section 8. Exposure controls/personal protection.** This section contains no new requirements other than format.

- OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), 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.

**Section 9. Physical and chemical properties.** This section contains no new requirements other than format.

- 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;
- Viscosity.

**Section 10. Stability and reactivity.** Although the information on conditions to avoid and hazardous decomposition products is new to HCS, it has been required in the ANSI Z400.1 standard for a number of years.

- Reactivity;
- Chemical stability;
- Possibility of hazardous reactions;
- Conditions to avoid (e.g., static discharge, shock, or vibration);
- Incompatible materials;
- Hazardous decomposition products.

**Section 11. Toxicological information.** This section contains no new requirements other than format. Description of the various toxicological (health) effects and 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;
- Delayed and immediate effects and also chronic effects from short- and long-term exposure;
- Numerical measures of toxicity (such as acute toxicity estimates).
- Whether the hazardous 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 by OSHA.

**Section 12. Ecological information (Non-mandatory).** To be GHS-compliant the requirements for this section are provided.

- Ecotoxicity (aquatic and terrestrial, where available);
- Persistence and degradability;
- Bioaccumulative potential;
- Mobility in soil;

**Section 13. Disposal considerations (Non-mandatory).** To be GHS-compliant the requirements for this section are provided, but OSHA will not enforce. However, OSHA may enforce provisions associated with safe handling and use, including appropriate hygienic practices. See Section 7 above.

- Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging.

**Section 14. Transport information (Non-mandatory).** To be GHS-compliant the requirements for this section are provided, but OSHA will not enforce.

- UN number;
- UN proper shipping name;
- Transport hazard class(es);
- Packing group, if applicable;
- Environmental hazards (e.g., Marine pollutant (Yes/No));
- Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code);
- Special precautions, which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance either within or outside their premises.

**Section 15. Regulatory information (Non-mandatory).** To be GHS-compliant the requirements for this section are provided, but OSHA will not enforce.

- Safety, health and environmental regulations specific for the product in question.

**Section 16. Other information, including date of preparation or last revision.** This section contains no new requirements other than format.

- The date of preparation of the SDS or the last change to it.