APPENDIX D—SAFETY DATA SHEETS (MANDATORY)

A safety data sheet (SDS) shall include the information specified in Table D.1 under the section number and heading indicated for sections 1-11 and 16. If no relevant information is found for any given subheading within a section, the SDS shall clearly indicate that no applicable information is available. Sections 12-15 may be included in the SDS, but are not mandatory.

Table D.1
Minimum Information for an SDS

Heading	Subheading
1. Identification	(a) Product identifier used on the label;
	(b) Other means of identification;
	(c) Recommended use of the chemical and restrictions on use;
	(d) Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party;
	(e) Emergency phone number.
2. Hazard(s) identification	(a) Classification of the chemical in accordance with paragraph (d) of §1910.1200;
	(b) 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);
	(c) Describe any hazards not otherwise classified that have been identified during the classification process;
	(d) Where an ingredient with unknown acute toxicity is used in a mixture at a concentration = 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.
3. Composition/ information on ingredients	Except as provided for in paragraph (i) of §1910.1200 on trade secrets:
	For Substances
	(a) Chemical name;
	(b) Common name and synonyms;
	(c) CAS number and other unique identifiers;
	(d) 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:
	(a) 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
	(1) are present above their cut-off/concentration limits; or
	(2) present a health risk below the cut-off/concentration limits.
	(2) present a health risk below the cut-off/concentration limits.
	(b) The concentration (exact percentage) shall be specified unless a trade secret claim is made in accordance with paragraph (i) of §1910.1200, 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

Table D.1 Minimum Information for an SDS	
Heading	**Subheading**
3. Composition/ information on ingredients (continued)	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 (concentration) of composition has been withheld as a trade secret is required.
4. First-aid measures	(a) Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact, and ingestion;
	(b) Most important symptoms/effects, acute and delayed.
	(c) Indication of immediate medical attention and special treatment needed, if necessary.
5. Fire-fighting measures	(a) Suitable (and unsuitable) extinguishing media.
	(b) Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products).
	(c) Special protective equipment and precautions for fire-fighters.
6. Accidental release measures	(a) Personal precautions, protective equipment, and emergency procedures.
	(b) Methods and materials for containment and cleaning up.
7. Handling and storage	(a) Precautions for safe handling.
	(b) Conditions for safe storage, including any incompatibilities.
8. Exposure controls/personal protection	(a) 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.
	(b) Appropriate engineering controls.
	(c) Individual protection measures, such as personal protective equipment.
9. Physical and chemical properties	(a) Appearance (physical state, color, etc.);
	(b) Odor;
	(c) Odor threshold;
	(d) pH;
	(e) Melting point/freezing point;
	(f) Initial boiling point and boiling range;
	(g) Flash point;
	(h) Evaporation rate;
	(i) Flammability (solid, gas);
	(j) Upper/lower flammability or explosive limits;
	(k) Vapor pressure;
	(l) Vapor density;
	(m) Relative density;
	(n) Solubility(ies);
	(o) Partition coefficient: n-octanol/water;
	(p) Auto-ignition temperature;
	(q) Decomposition temperature;
	(r) Viscosity.

Table D.1 Minimum Information for an SDS	
Heading	**Subheading**
10. Tability and reactivity	(a) Reactivity;
	(b) Chemical stability;
	(c) Possibility of hazardous reactions;
	(d) Conditions to avoid (e.g., static discharge, shock, or vibration);
	(e) Incompatible materials;
	(f) Hazardous decomposition products.
11. Toxicological information	Description of the various toxicological (health) effects and the available data used to identify those effects, including:
	(a) Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact);
	(b) Symptoms related to the physical, chemical and toxicological characteristics;
	(c) Delayed and immediate effects and also chronic effects from short- and long-term exposure;
	(d) Numerical measures of toxicity (such as acute toxicity estimates).
	(e) 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 edition), or by OSHA.
12. Ecological information (Non-mandatory)	(a) Ecotoxicity (aquatic and terrestrial, where available);
	(b) Persistence and degradability;
	(c) Bioaccumulative potential;
	(d) Mobility in soil;
	(e) Other adverse effects (such as hazardous to the ozone layer).
13. Disposal considerations (Non-mandatory)	Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging.
14. Transport information (Non-mandatory)	(a) UN number;
	(b) UN proper shipping name;
	(c) Transport hazard class(es);
	(d) Packing group, if applicable;
	(e) Environmental hazards (e.g., Marine pollutant (Yes/No));
	(f) Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code);
	(g) 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.
15. Regulatory information (Non-mandatory)	Safety, health and environmental regulations specific for the product in question.
16. Other information, including date of preparation or last revision	The date of preparation of the SDS or the last change to it.

[77 FR 17884, March 26, 2012]

Michigan Department of Licensing and Regulatory Affairs
Michigan Occupational Safety & Health Administration
Consultation Education & Training Division

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HAZARD COMMUNICATION - Aligning with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

OVERVIEW OF MAJOR CHANGES TO THE HAZARD COMMUNICATION STANDARD (HCS)

The three major areas of change are in hazard classification, labels, and safety data sheets.

Hazard classification: The term "hazard determination" has been changed to "hazard classification." The "hazard classification" approach in the revised HCS is quite different. Chemical manufacturers and importers shall evaluate chemicals produced in their workplaces or imported by them and determine the hazard classes and where appropriate, the category of each class that apply to the chemical being classified. In doing so, they shall identify and consider the full range of available scientific literature and evidence concerning the potential hazards. There is no requirement to test the chemical to determine how to classify its hazards. The revised HCS has specific criteria for each health and physical hazard, along with detailed instructions for hazard evaluation. It also establishes both "hazard classes" and "hazard categories" — for most of the effects; the classes are divided into categories that reflect the relative severity of the effect. OSHA has included the general provisions for hazard classification in paragraph (d) of the revised rule, and added extensive appendixes (Appendix A – for health hazards and Appendix B – for physical hazards) that address the criteria for each health or physical effect.

Labels: Chemical manufacturers and importers shall provide a label that includes a:

* Product identifier
* Supplier Identifier
* **Precautionary statement(s)**
* **Pictogram**
* **Signal word (Warning or Danger)**
* **Hazard statement for each hazard class and category**

SAMPLE LABEL

PRODUCT IDENTIFIER

CODE _____
Product Name _____

SUPPLIER IDENTIFICATION

Company Name_____
Street Address _____
City _____ State _____
Postal Code _____ Country _____
Emergency Phone Number _____

PRECAUTIONARY STATEMENTS

Keep container tightly closed. Store in 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 measure 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.
Dispoae of in accordance with local, regional, national, international regulations as specified.

In Case of Fire: use dry chemical (BC) or Carbon dioxide (CO_2) fire extinguisher to extinguish.

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

HAZARD PICTOGRAMS

SIGNAL WORD
Danger

HAZARD STATEMENT

Highly flammable liquid and vapor.
May cause liver and kidney damage.

SUPPLEMENTAL INFORMATION

Directions for use
_____
_____
_____

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

Pictogram: 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. Each pictogram consists of a different symbol on a white background within a red square frame set on a point (i.e. a red diamond). There are nine pictograms under the GHS. However, only **eight pictograms are required under the HCS**. The exception being, the environmental pictogram, as environmental hazards are not within OSHA's jurisdiction. **Pictograms must have red borders**.

The **hazard pictograms and their corresponding hazards are shown below.**

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)
Gas Cylinder 	**Corrosion** 	**Exploding Bomb** 
• Gases under Pressure	• Skin Corrosion/ burns • Eye Damage • Corrosive to Metals	• Explosives • Self-Reactives • Organic Peroxides
Flame over Circle 	**Environment (Non Mandatory)** 	**Skull and Crossbones** 
• Oxidizers	• Aquatic Toxicity	• Acute Toxicity (fatal or toxic)

Signal words: A single word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. The signal words used are **"Danger"** and **"Warning."** "Danger" is used for the more severe hazards, while "Warning" is used for less severe hazards.

Hazard Statement: 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.

Precautionary Statement: A phrase that describes recommended measures to be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling of a hazardous chemical.

Safety Data Sheets (SDSs): Will now have a specified **16-section format**. A material safety data sheet (MSDS) is now referred to as a safety data sheet (SDS).

Paragraph (g) of the final rule indicates the headings of information to be included on the SDS and the order in which they are to be provided. In addition, **Appendix D indicates what information is to be included under each heading**. The SDS format is the same as the ANSI standard format which is widely used in the U.S. and is already familiar to many employees.

The format of the 16-section SDS must include the following sections:

Section 1. Identification
Section 2. Hazard(s) identification
Section 3. Composition/information on ingredients
Section 4. First Aid measures

Section 5. Fire fighting measures
Section 6. Accidental release measures
Section 7. Handling and storage
Section 8. Exposure controls/personal protection
Section 9. Physical and chemical properties
Section 10. Stability and reactivity
Section 11. Toxicological information
Section 12. Ecological information
Section 13. Disposal considerations
Section 14. Transport information
Section 15. Regulatory information
Section 16. Other information, including date of preparation or last revision

Sections 12-15 may be included in the SDS, but are not required by OSHA.

RESOURCE INFORMATION:
Information related to the changes affecting OSHA's Hazard Communication Standard can be found on OSHA's website at http://www.osha.gov/dsg/hazcom/index.html.

OSHA Fact Sheet – Summarizing Changes to Hazard Communication Standard Final Rule Fact Sheet **OSHA Quick Card - Labeling**
OSHA Quick Card & OSHA BRIEF - Safety Data Sheets
OSHA Quick Card - Pictograms
Side by Side Comparison of Existing and Revised HCS

HCS/GHS Final Rule [PDF 2.33 MB]
Federal Register: The final rule was filed on March 20th at the Office of the Federal Register and available for viewing on their Public Electronic Inspection Desk. The Federal Register published the final rule on March 26, 2012. The effective date of the final rule is 60 days after the date of publication.

he table below summarizes the phase-in dates required under the revised Hazard Communication Standard (HCS):

ctive Completion Date	**Requirement(s)**	**Who**
December 1, 2013	**Train employees on the new label elements and safety data sheet (SDS) format.** OSHA is requiring that employees are trained on the new label elements (e.g., pictograms and signal words) and SDS format by December 2013, while full compliance with the final rule will begin in 2015. OSHA's rationale for this is that employees will begin to see the new labels and SDSs in their workplaces, they need to be familiar with them, understand how to use them, and access the information effectively.	**Employers**
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.	Employers
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

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Hazard Communication Safety Data Sheets

The Hazard Communication Standard (HCS) requires chemical manufacturers, distributors, or importers to provide Safety Data Sheets (SDSs) (formerly known as Material Safety Data Sheets or MSDSs) to communicate the hazards of hazardous chemical products. As of June 1, 2015, the HCS will require new SDSs to be in a uniform format, and include the section numbers, the headings, and associated information under the headings below:

Section 1, Identification includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.

Section 2, Hazard(s) identification includes all hazards regarding the chemical; required label elements.

Section 3, Composition/information on ingredients includes information on chemical ingredients; trade secret claims.

Section 4, First-aid measures includes important symptoms/effects, acute, delayed; required treatment.

Section 5, Fire-fighting measures lists suitable extinguishing techniques, equipment; chemical hazards from fire.

Section 6, Accidental release measures lists emergency procedures; protective equipment; proper methods of containment and cleanup.

Section 7, Handling and storage lists precautions for safe handling and storage, including incompatibilities.

(Continued on other side)

For more information:

OSHA® Occupational Safety and Health Administration

U.S. Department of Labor

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

OSHA 3493-02 2012

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Hazard Communication Safety Data Sheets

Section 8, Exposure controls/personal protection lists OSHA's Permissible Exposure Limits (PELs); Threshold Limit Values (TLVs); appropriate engineering controls; personal protective equipment (PPE).

Section 9, Physical and chemical properties lists the chemical's characteristics.

Section 10, Stability and reactivity lists chemical stability and possibility of hazardous reactions.

Section 11, Toxicological information includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.

Section 12, Ecological information*
Section 13, Disposal considerations*
Section 14, Transport information*
Section 15, Regulatory information*

Section 16, Other information, includes the date of preparation or last revision.

*Note: Since other Agencies regulate this information, OSHA will not be enforcing Sections 12 through 15 (29 CFR 1910.1200(g)(2)).

Employers must ensure that SDSs are readily accessible to employees.
See Appendix D of 29 CFR 1910.1200 for a detailed description of SDS contents.

For more information:

OSHA® Occupational Safety and Health Administration

U.S. Department of Labor

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

OSHA 3493-02-2012

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Hazard Communication Standard Pictogram

As of June 1, 2015, the Hazard Communication Standard (HCS) will require pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification.

HCS 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 (harmful) • 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)

For more information:

OSHA® Occupational Safety and Health Administration

U.S. Department of Labor

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

OSHA 3491-02 2012

OSHA® QUICK CARD™

Hazard Communication Standard Labels

OSHA has updated the requirements for labeling of hazardous chemicals under its Hazard Communication Standard (HCS). As of June 1, 2015, all labels will be required to have pictograms, a signal word, hazard and precautionary statements, the product identifier, and supplier identification. A sample revised HCS label, identifying the required label elements, is shown on the right. Supplemental information can also be provided on the label as needed.

For more information:

OSHA® Occupational Safety and Health Administration

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

SAMPLE LABEL

CODE _____
Product Name _____
} **Product Identifier**

Company Name _____
Street Address _____
City _____ State ____
Postal Code _____ Country ____
Emergency Phone Number _____
} **Supplier Identification**

Hazard Pictograms

Signal Word
Danger

Highly flammable liquid and vapor.
May cause liver and kidney damage.
} **Hazard Statements**

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 (CO_2) 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.

} **Precautionary Statements**

Supplemental Information

Directions for Use
_____
_____
_____

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

OSHA 3492-02 2012

This Workplace Covered by the Michigan Right To Know Law

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Employers must make available for employees in a readily accessible manner, Safety Data Sheets (SDS)* for those hazardous chemicals in their workplace.

Employees cannot be discharged or discriminated against for exercising their rights including the request for information on hazardous chemicals.

Employees must be notified and given direction (by employer posting) for locating Safety Data Sheets and the receipt of new or revised SDS(s).

*** When the employer has not provided a SDS, employees may request assistance in obtaining SDS from the:**

Michigan Department of Licensing and Regulatory Affairs
Michigan Occupational Safety & Health Administration
General Industry Safety & Health Division
(517) 322-1831
Construction Safety & Health Division
(517) 322-1856
www.michigan.gov/miosha
MIOSHA/CET #2105 (Rev. 12/12)

MIOSHA
Michigan Occupational Safety and Health Administration

SDS(s) For This Workplace Are Located At

_____
Location(s)

_____
Location(s)

_____
Person(s) responsible for SDS(s)

_____
Phone

As Required by the Michigan Right To Know Law

TO BE POSTED THROUGHOUT THE WORKPLACE NEXT TO THE SAFETY DATA SHEETS (SDS) LOCATION POSTERS

New or Revised SDS

New or Revised	Receipt Date	Posting Date	Location of New or Revised SDS

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Michigan Occupational Safety & Health Administration
Consultation Education & Training Division
(517) 322-1809

Paid in part with
Federal OSHA funds.
MIOSHA/CET #2106 (Revised 12/12)

For further information visit our website at:
www.michigan.gov/miosha