Hazard Communication and the Globally Harmonized System (GHS)

Aligning OSHA Requirements with the United Nations' Globally Harmonized System for the Classification and Labeling of Chemicals (GHS)

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Overview

- Brief overview of the GHS
- Benefits of revising the Hazard Communication Standard (HCS) to adopt the GHS
- Description of some of the major changes to the HCS
- Guidance Products
- Potential impact on RCRA

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GHS

- Globally Harmonized System of classification and labeling
- Created by the U.N.
- A common, coherent approach to classifying and communicating chemical hazards

OSHA and the GHS

- OSHA's 1983 final HCS included recognition of the importance of international harmonization of such requirements, and a commitment to work towards an international approach
- The Agency:
  - Supported adoption of the international mandate to develop the GHS;
  - Helped to negotiate the provisions of the GHS; and
  - Leads the current US delegation to the United Nations' Committee and Subcommittee on the GHS

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Development of OSHA's Final Rule

- An Advanced Notice of Proposed Rulemaking to modify the existing HCS to align it with the GHS published in 2006
- Notice of Proposed Rulemaking published in the Federal Register on September 30, 2009 (74 FR 50280-50549)
- Public hearings held in 2010
- The final rule published in the Federal Register on March 26, 2012

Why align HCS with GHS?

The GHS approach is designed to improve comprehensibility, and thus the effectiveness of the HCS, and help to further reduce occupational illnesses and fatalities

Why align HCS with GHS?

- The primary purpose of the HCS is to reduce chemical source illnesses and injuries
- Since the HCS was promulgated in 1983, acute illnesses and injuries from chemicals have decreased 42%
- However, there is still a critical need for effective information to protect exposed workers from chemicals—particularly from chronic effects

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Why align HCS with GHS?

- By updating HCS to align with GHS, OSHA is enhancing the benefits of its provisions
- A key part of the new approach is increased comprehensibility due to the standardized or harmonized approach to information dissemination

Benefits of GHS alignment

- Increase the quality and consistency of information provided to the workers, employers and chemical users
  - –Reduce confusion/Increase comprehension of hazards
  - –Improve downstream risk management
  - –Facilitate training and help address literacy problems
- Reduce burden on American businesses by increasing productivity, fewer SDS and label updates, and simpler training requirements
- Reduce International trade barriers

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GHS Alignment Principles

- OSHA has modified only the provisions of the HCS that must be changed to align with GHS
- The basic HCS framework remains the same:
  - Chemical manufacturers/importers are responsible for providing information about the identities and hazards of the chemicals they produce or import
  - All employers with hazardous chemicals in their workplace are still required to have a hazard communication program, and provide information to employees about the hazards of the chemicals they work with along with protective measures

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GHS Alignment Principles

- Other aspects of the standard have minimal modifications in terminology to make them consistent with GHS
  - The scope and application is basically unchanged, maintaining practical accommodations made by OSHA
  - Written hazard communication program requirements, worker training, and trade secret provisions are all largely unchanged from the existing rule

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Related Aspects of Alignment

- Maintain consistency with major trading partners where possible
- Revise other OSHA standards that will be affected by the changes to the HCS
- Minimize country-specific deviations to be as harmonized as possible with GHS provisions

Modified Hazard Communication Standard

Organization of the Final Rule

- Keep the regulatory text as simple as possible, adding the detailed specification requirements to Appendices
  - Employers who do not have to classify hazards or prepare labels and safety data sheets (SDSs) do not need to access or be familiar with much of the new text

Organization of the Final Rule

- (a) Purpose
- (b) Scope and Application
- (c) **Definitions**
- (d) **Hazard Classification**
- (e) Written Hazard Communication Program
- (f) **Labels and Other Forms of Warning**
- (g) **Safety Data Sheets**
- (h) **Employee Information and Training**
- (i) Trade Secrets
- (j) **Effective Dates**
- **Appendices A -F**

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Appendicies

- Appendix A, Health Hazard Criteria (Mandatory) (NEW)
- Appendix B, Physical Hazard Criteria (Mandatory) (NEW)
- Appendix C, Allocation of Label Elements (Mandatory) (NEW)
- Appendix D, Safety Data Sheets (Mandatory) (NEW)
- Appendix E, Definition of “Trade Secret” (Mandatory)
- Appendix F, Guidance for Hazard Classifications re: Carcinogenicity (Non-Mandatory) (NEW)

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a) Purpose

HCS 1994

- All hazards to be ***evaluated***
- Comprehensive hazard communication program to transmit information
- Preempt state laws

HCS 2012

- All hazards to be ***classified***
- Other provisions the same, except OSHA added that the rule is consistent with Revision 3 of the GHS
- Slight clarifying modification was made to the language regarding preemption

b) Scope and Application

HCS 1994

- All chemicals known to be present are covered
- Practical accommodations for special situations
- Addresses interface with other Federal laws

HCS 2012

- Minimal changes except to conform terminology, and remove reference to current Appendix E which has been deleted from the standard and a clarification on Federalism

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c) Definitions

HCS 1994

- Includes specific definitions for terms used in the standard, as well as all physical hazards

HCS 2012

- Physical hazard definitions removed from paragraph (c), and placed in a new Appendix B on physical hazard classification criteria
- Following terms are also deleted: flashpoint (methods included in Appendix B), hazard warning, material safety data sheets
- Some definitions are revised to be GHS-consistent,
- New definitions added for classification

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d) Hazard Classification

HCS 1994

- Performance-oriented
  - Definitions in paragraph (c), Appendices A and B
  - Appendix B—parameters for evaluating data
  - “Floor” of chemicals considered hazardous
  - “One study” rule
  - Standardized mixture cut-off rules

HCS 2012

- Specific and detailed
  - Concept of “classification” vs. determination in current rule
  - Each hazard class has detailed criteria to apply to data on the chemical
  - No floor; based on weight of evidence
  - Mixture rules are specific to each hazard class

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Hazard Classification

- Each physical or health hazard is a “hazard class” (e.g., Carcinogenicity is a hazard class)
- A “hazard class” may be sub-divided in the criteria into several “hazard categories” based on the degree of severity of the hazard
- Placing a chemical into a “hazard class” , and where necessary, a “hazard category”, is the concept of classification—determining not only the hazard, but also the severity of the effect

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HCS 1994 vs. HCS 2012: Hazard Classification

- HCS 1994 Corrosive Definition:
  - "Corrosive:" A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact. For example, a chemical is considered to be corrosive if, when tested on the intact skin of albino rabbits by the method described by the U.S. Department of Transportation in appendix A to 49 CFR part 173, it destroys or changes irreversibly the structure of the tissue at the site of contact following an exposure period of four hours. This term shall not refer to action on inanimate surfaces.

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HCS 1994 vs. HCS 2012: Hazard Classification

- HCS 2012 (GHS) Corrosive Definition (skin):
  - A.2.1.1 *Skin corrosion* is the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis, following the application of a test substance for up to 4 hours. .Corrosive reactions are typified by ulcers, bleeding, bloody scabs, and, by the end of observation at 14 days, by discoloration due to blanching of the skin, complete areas of alopecia, and scars. Histopathology should be considered to evaluate questionable lesions.

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HCS 1994 vs. HCS 2012: Hazard Classification

- HCS 2012 Corrosive Definition
  - Based on GHS Criteria:

Category 1: Corrosive	Corrosive sub-categories	Corrosive in ≥ 1 of 3 animals	
		Exposure	Observation
	1A	≤ 3 min	≤ 1 h
	1B	> 3 min ≤ 1 h	≤ 14 days
	1C	> 1 h ≤ 4 h	≤ 14 days

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Hazard Classification

- Manufacturers are still responsible for determining the hazards of the chemicals they produce or import
- Classification (similar to hazard determination) is based on the full range of available information
- The procedures for determining if the manufacturer has properly performed the hazard classification are provided in Appendix A (health) and Appendix B (physical)

Health Hazards

Hazard Class	Hazard Category			
Acute Toxicity	1	2	3	4
Skin Corrosion/Irritation	1A	1B	1C	2
Serious Eye Damage/ Eye Irritation	1	2A	2B	
Respiratory or Skin Sensitization	1			
Germ Cell Mutagenicity	1A	1B	2	
Carcinogenicity	1A	1B	2	
Reproductive Toxicity	1A	1B	2	Lactation
STOT – Single Exposure	1	2	3	
STOT – Repeated Exposure	1	2		
Aspiration	1			
Simple Asphyxiants	Single Category			

Health Hazards, cont.

For carcinogens - OSHA is allowing classifiers to use determinations of IARC/NTP for classification instead of performing their own hazard evaluation

- See new Appendix F

Physical Hazards

Hazard Class	Hazard Category						
Explosives	Unstable Explosives	Div 1.1	Div 1.2	Div 1.3	Div 1.4	Div 1.5	Div 1.6
Flammable Gases	1	2					
Flammable Aerosols	1	2					
Oxidizing Gases	1						
Gases under Pressure Compressed Gases Liquefied Gases Refrigerated Liquefied Gases Dissolved Gases	1						
Flammable Liquids	1	2	3	4			
Flammable Solids	1	2					
Self-Reactive Chemicals	Type A	Type B	Type C	Type D	Type E	Type F	Type G
Pyrophoric Liquids	1						
Pyrophoric Solid	1						
Pyrophoric Gases	Single category						
Self-heating Chemicals	1	2					
Chemicals, which in contact with water, emit flammable gases	1	2	3				
Oxidizing Liquids	1	2	3				
Oxidizing Solids	1	2	3				
Organic Peroxides	Type A	Type B	Type C	Type D	Type E	Type F	Type G
Corrosive to Metals	1						
Combustible Dusts	Single Category						

Hazards not Otherwise Classified

- One unique aspect to the OSHA's final rule is the definition of "hazards not otherwise classified"
- This definition was added to ensure that hazards currently covered by HCS continue to be covered
- Changes from current practices are not anticipated (used during literature reviews)

Hazards not Otherwise Classified

"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).

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Mixtures

- HCS 2012 has a tiered approach to mixtures, with each health hazard class having a specific approach
  - Step 1: Use available test data on the mixture as a whole to classify the mixture based on the substance criteria
  - Step 2: Use bridging principles to extrapolate from other data (e.g., dilution principle)
  - Step 3: Estimate hazards based on known information regarding the ingredients of the mixture (cut-offs may be applied)
  - Except for chronic health hazards
- Chemical manufacturers and importers may rely on the information provided in ingredient SDSs unless they have a reason to know that it is inaccurate

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Hazards not Otherwise Classified

- Information will be required on the safety data sheets in Section 2
- Hazard information on the label, while not mandatory, can be provided under supplementary information
- Such hazards must also be addressed in worker training

Simple Asphyxiant and Pyrophoric Gas

- "Simple asphyxiant" means a substance or mixture that displaces oxygen in the ambient atmosphere, and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death.
  - Label: ***Warning. May displace oxygen and cause rapid suffocation.***
- "Pyrophoric gas" means a chemical in a gaseous state that will ignite spontaneously in air at a temperature of 130 degrees F (54.4 degrees C) or below.
  - Label: ***Danger. Catches fire spontaneously if exposed to air.***

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Combustible Dust

- Combustible dust is covered separately from HNOC, but is not specifically defined
- Guidance for defining combustible dust is to be taken from existing documents, including the directive for the National Emphasis Program; the NFPA standards also provide useful information
- Combustible dust must be addressed on labels where appropriate:
  - ***Warning. May form combustible dust concentrations in air.***
  - Paragraph (f)(4) may apply to materials shipped in solid form, that create combustible dust when processed

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f) Labels and Other Forms of Warning

HCS 1994

- Shipped containers to be labeled with identity, appropriate hazard warnings, and responsible party
- Performance-oriented, specifics left to discretion of chemical manufacturer or importer

HCS 2012

- Shipped containers to be labeled with product identifier; signal word; hazard statement(s); pictograms; precautionary statements; and responsible party
- Specifies information by hazard class and category

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Approach to Labels

- The final rule—like the GHS—is a specification approach to labels. In Appendix C, OSHA has indicated by hazard class and hazard category the label elements that must be on the label
- Appendix C is basically a cookbook approach to labeling—once classification of the hazards is completed, Appendix C is to be consulted to determine how to convey the required information

Label Requirements for Shipped Containers

- Product identifier
- Signal word
- Hazard statement(s)
- Pictogram(s)
- Precautionary statement(s)
- Name, address, and phone number of the responsible party

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)

Red vs. Black Borders

- The GHS allows competent authorities to use only black borders on pictograms for domestic shipments
- OSHA is requiring red borders regardless of the shipment's destination
- The red borders increase comprehensibility
- The requirement for red borders will result in additional options being developed to comply; for example, new printers are becoming available for this requirement
- Blank red diamonds are not permitted on a label

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Label Example

HCS 1994

Minimum requirements

ToxiFlam
TOXIC
COMBUSTIBLE LIQUID AND
VAPOR

My Company, My Street, MyTown NJ
00000
Tel: 444 999 9999

HCS 2012

Minimum Requirements

ToxiFlam (Contains: XYZ)

Danger! Toxic If Swallowed, Flammable Liquid and Vapor

Do not eat, drink or use tobacco when using this product. Wash hands thoroughly after handling. Keep container tightly closed. Keep away from heat/sparks/open flame. – No smoking. Wear protective gloves and eye/face protection. Ground container and receiving equipment. Use explosion-proof electrical equipment. Take precautionary measures against static discharge. Use only non-sparking tools. Store in cool/well-ventilated place.

IF SWALLOWED: Immediately call a POISON CONTROL CENTER or doctor/physician. Rinse mouth.

In case of fire, use water fog, dry chemical, CO_2, or "alcohol" foam.

See Material Safety Data Sheet for further details regarding safe use of this product

MyCompany, MyStreet, MyTown, NJ 00000, Tel: 444 999 9999

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Updating Labels

- OSHA proposed to require labels to be updated within three months of getting new and significant information about the hazards
- The final rule requires containers shipped six months after the information is available to be labeled accordingly

Workplace Labels

- HazCom 2012 maintains the flexible approach to workplace labels in the current rule, i.e., the GHS label does not have to be on all workplace containers
- Workplace labels will have to be reviewed to make sure they still convey the correct hazards and other information when these new requirements are implemented

g) Safety Data Sheets

HCS 1994

- Specifies what information is required, but chemical manufacturer or importer can use whatever format or order of information they want

HCS 2012

- Mandates 16-section SDS headings, order of information, and what information is to be provided under the headings
- Will not enforce sections 12-15 that require information outside OSHA's jurisdiction

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16 Section Safety Data Sheet

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

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Appendix D

- Specifies the minimum information to be included in each of the 16 sections.
- Two revisions in this information are in the final rule:
  - ACGIH TLVs continue to be required on the SDS
  - Information regarding carcinogenicity classifications by IARC and NTP also continue to be required

h) Employee Information and Training

HCS 1994

- Requires employee information and training before a worker is exposed to the hazardous chemicals in the workplace, and whenever the hazard changes

HCS 2012

- Clarifies that the labels on shipped containers and workplace labels must be explained, as well as SDS format
- Workers will have to be trained on the new label and SDS formats before all the provisions of the rule are effective

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Training

- Since the new label and SDS requirements will be phased in over several years, it is critical that employees understand the label and SDS formats, and the way information is conveyed
- Training on the system is thus the first compliance date for the rule; workers are already starting to see GHS labels and SDSs on imported chemicals

i) Trade Secrets

HazCom 1994

- Allows specific chemical identity to be protected when it is a legitimate trade secret
- Specifies conditions for protection, and for release when there is a safety and health need for the information

HazCom 2012

- Process remains the same
- Percentage of a substance in a mixture is also considered to be a type of trade secret subject to the provisions in the rule

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j) Effective Dates

Effective Completion Date	Requirement(s)	Who
December 1, 2013	Train employees on the new label elements and SDS format.	Employers
June 1, 2015* **December 1, 2015**	Comply with all modified provisions of this final rule, except: Distributors may ship products labeled by manufacturers under the old system until December 1, 2015.	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	Comply with either 29 CFR 1910.1200 (this final standard), or the current standard, or both.	All chemical manufacturers, importers, distributors and employers

***This date coincides with the European Union implementation date for classification of mixtures.

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Approach to Other Standards

- Many other OSHA standards contain criteria related to defining hazards, as well as other provisions that rely on those criteria
- OSHA undertook a comprehensive review of its rules to identify what needed to be changed
- OSHA has proposed modifications to all of those standards that it determined needed to be consistent with the GHS

Changes in the Workplace

- For Employers
  - Initial employee training on the label elements
  - Minimal training on new SDS format
  - Continue to maintain the updated SDSs
  - Review current hazard communication program and update as necessary
- For manufacturers
  - Initial start-up costs associated with reclassification, producing new labels, safety data sheets, training.

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Guidance Materials

- OSHA will develop an array of guidance materials
  - Initial Materials:
    - Quick Cards, Fact sheets, Small Entity Compliance guides
  - Technical Materials
    - Model Training materials; Safety Data Preparation guidance; Hazard Classification Guidance
  - Web Applications

Impact on RCRA

- HazCom 2012 continues to exempt hazardous waste under 1910.1200(b)(6).
- Employers will need to train their employees on the new label and SDS requirements
  - Use in the workplace
  - Use in emergency response and contingency planning

Post-Rulemaking Developments

- Several industry groups have petitioned a federal appeals court to challenge the Final Rule:
  - CropLife America is concerned with possible labeling conflicts on FIFRA-regulated products
  - American Petroleum Institute is criticizing the mixture rules
  - American Chemistry Council is concerned about the classification of combustible dusts

Additional Information

- Contacts:
  - Amy E Wilson:
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- OSHA's website on Hazard Communication
  - http://www.osha.gov/dsg/hazcom/index.html

Questions?