The Globally Harmonized System for Hazard Communication (GHS)



University of Arkansas Facilities Management Office of Environmental Health & Safety

What is GHS?



- GHS is an international approach to hazard communication, providing agreed upon criteria for classification of chemical hazards, and a standardized approach to label elements and safety data sheets.
- GHS was negotiated in a multi-year process by hazard communication experts from many different countries, international organizations, and stakeholder groups.
- GHS is based on major existing systems around the world, including OSHA's Hazard Communication Standard and chemical classification and labeling systems of other U. S. agencies.

GHS Background

In 2003, the United Nations (UN) adopted the *Globally Harmonized System of Classification and Labeling of Chemicals (GHS)*.

The GHS includes criteria for the classification of health, physical and environmental hazards, as well as specifying what information should be included on labels of hazardous chemicals and on safety data sheets.

The United States was an active participant in the development of the GHS, and is a member of the UN bodies established to maintain and coordinate implementation of the system.

The GHS also provides a basis for harmonization of rules and regulations on chemicals at national, regional and worldwide level, an important factor for trade facilitation.

The first edition of the GHS, which was intended to serve as the initial guide for global implementation, was adopted in December 2002 and published in 2003.

Since then, the GHS has been updated, revised and improved every two years as needs arise and experience is gained in its implementation.

On December 14, 2012, a set of amendments to the fourth revised edition of the GHS was adopted. Revisions included :

- Inter alia, a new test method for oxidizing solids.
- Miscellaneous provisions intended to further clarify the criteria for some hazard classes (skin corrosion/irritation, severe eye damage/irritation, and aerosols) and to complement the information to be included in the Safety Data Sheet.
- Revised and simplified classification and labeling summary tables.
- A new codification system for hazard pictograms and revised and further rationalized precautionary statements.

The <u>fifth revised edition</u> of the GHS to be published in 2013 takes account of these amendments.

Why adopt GHS?



- OSHA has modified the <u>Hazard Communication Standard (HCS)</u> to allow adoption of the GHS to improve safety and health of workers through more effective communication regarding chemical hazards.
- Since it was first promulgated in 1983, the HCS has provided employers and employees extensive information on the chemical hazards in their workplaces.
- Adoption of the GHS by the U. S. and by countries around the world will improve the consistency of chemical information received from other countries. Since the U. S. is both a major importer and exporter of chemicals, American workers are often required to interpret labels and safety data sheets from other countries. If countries around the world adopt the GHS, the problems associated with varying formats will be minimized, and chemicals crossing borders will be accompanied with consistent information, thereby improving communications and safety.

What is the phase-in period for the revised Hazard



Communication Standard?

Effective Completion Date	Requirement(s)	Who
<u>December 1, 2013</u>	Train employees on the new label elements and safety data sheet (SDS) format.	<u>Employers</u>
June 1, 2015* (This date coincides with the EU implementation date for classification of mixtures) 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

Why training?



- Since many chemical manufacturers, foreign and American, have already begun to produce HazCom 2012/GHS-compliant labels and SDSs, OSHA expects that American workplaces will soon begin to receive labels and safety data sheets (SDSs) that are consistent with the GHS.
- It is important to ensure that when employees begin to see the new labels and SDSs in their workplaces, they are familiar with the content and format and understand how to use them effectively.

HazCom Standard changes?



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

- 1. <u>Hazard classification</u>: The definitions of hazards have been changed to provide specific criteria for classification of health and physical hazards, along with detailed instructions for hazard evaluation including determination for mixtures as well as substances. These specific criteria will help to ensure that evaluations of hazardous effects are consistent across manufacturers, and that labels and safety data sheets are more accurate as a result.
- 2. <u>Labels</u>: Chemical manufacturers and importers will be required to provide a label that includes a harmonized signal word, pictogram, and hazard statement for each hazard class and category. Precautionary statements must also be provided.
- 3. <u>Safety Data Sheets</u>: Will now have a specified 16-section format.

How will chemical hazard evaluation change under the HazCom Standard?



- Under both the current HazCom Standard (HCS) and the revised HCS, an evaluation of chemical hazards must be performed considering all available scientific evidence.
- The revised HCS has specific criteria for each health and physical hazard, along with detailed instructions for hazard evaluation and determination for mixtures as well as substances.
- The revised standard 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.

Revised HazCom Standard Labels?



Under the revised HCS, once the hazard classification is completed, the standard specifies what information is to be provided for each hazard class and category.

Labels will require the following elements:

- 1. **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.
- 2. Signal words: a word used to indicate the relative level of severity of the hazard and alert the reader to the potential hazard on the label. The signal words are "DANGER" and "WARNING". "DANGER" is used for more severe hazards, while "WARNING" is used for less severe hazards.
- **3. 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.
- 4. **Precautionary Statement**: a phrase that describes recommended measures to be taken to minimize or prevent adverse effects resulting from exposure to the labeled chemical, or resulting from improper storage or handling of the labeled chemical.

What pictograms are required and what hazards are identified?

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 (<u>fatal</u> or toxic)

Health Hazard





- Carcinogenic
- Mutagenic
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity





- 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 (<u>fatal</u> or toxic)

What's required for pictogram borders?

- Under the revised HCS, pictograms must have red borders.
- OSHA believes that the use of the red frame will increase recognition and comprehensibility. Therefore, the <u>red frame</u> is required regardless of whether the shipment is domestic or international.
- The HCS requires that all red borders printed on the label have a symbol printed inside it.



When must label information be updated?



- In the revised HCS, OSHA is lifting the stay on enforcement regarding the provision to update labels when new information on hazards becomes available.
- Chemical manufacturers, importers, distributors, or employers who become newly aware of any significant information regarding the hazards of a chemical shall revise the labels for the chemical within six months of becoming aware of the information, and shall ensure that labels on containers of hazardous chemicals shipped after that time contain the new information.
- If the chemical is not currently produced or imported, the chemical manufacturer, importer, distributor, or <u>employer shall</u> <u>add the information to the label</u> before the chemical is shipped or introduced into the workplace again.

How will workplace labeling provisions be changing under the revised Hazard Communication Standard?



- The current standard provides employers with flexibility regarding the type of system to be used in their workplaces and OSHA has retained that flexibility in the revised HCS.
- Employers may choose to label workplace containers either with the same label that would be on shipped containers for the chemical under the revised rule, or with label alternatives that meet the requirements for the standard.
- <u>Alternative labeling systems</u> such as the National Fire Protection Association (NFPA) 704 Hazard Rating and the Hazardous Material Information System (HMIS) are permitted for workplace containers, but the information supplied on these labels must be consistent with the revised HCS, e.g., no conflicting hazard warnings or pictograms.



How is the Safety Data Sheet changing under the revised HCS?



- The information required on the safety data sheet (SDS) will remain <u>essentially the same</u> as that in the current standard (HazCom 1994).
- HazCom 1994 indicates what information has to be included on an SDS, but does not specify a format for presentation or order of information.
- The revised HCS requires that the information on the SDS be presented using <u>specific headings in a specified sequence.</u>



16-Section SDS should 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



Safety Data Sheets

SAFETY DATA SHEET Based upon Regulation (EC) No. 1907/2006, as amended by Regulation (EC) No. 453/2010						
	isoprop	vl aceta	ate			
ION 1: Identification	of the substance/mixt	ure and of	the co	mpany/undertaking		
1 Product identifier:				inpant// anacraning		
Product name Synonyms Registration number REACH Product type REACH CAS number EC Index number EC number RTECS number Molecular mass	1 isopropyl acetate 2 aceta ced, J. methylethyl ester; IPAC 0 i / 21195/3724 46-0000 2 sluthance/mono-constituent (Organic) 1 108-314 1 078-714 2 078-561-1 2 Al430000 1 102, 1 14 1 102, 1 14					
Formula	: C5H1002					
2 Relevant identified uses o	of the substance or mixture and	uses advised a	against:			
1.2.1 Relevant identified uses						
Exposure scenario title		Exposure scenario group	Sector of use	Use descriptors (PROC or PC)	Use descriptors (ERC)	
ES1: Manufacture of substan	ce including distribution	Industrial	SU 8	PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 15	ERC 1	
ES2: Formulation & (re)packin and professional)	ng of substances and mixtures (industrial	Industrial	SU 10	PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 9, PROC 15	ERC 2	
ES3: Industrial use of coating		Industrial		PROC 1, PROE 2, PROC 3, PROC 4, PROC 5, PROC 2, PROC 8a, PROC 8b, PROC 9, PROC 10, PROC 18, PROC 14, PROC 15	ERC 4	
		Professional		S, PROC 3, PROC 3a, PROC 3b, PROC 10, PROC 11, PROC 13, PROC 35, PROC 19 PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 13, PROC 4, PROC 10, PROC 11 PROC 13, PROC 45, PROC 19	ERC 8d	
1.2.2 Uses advised against						
1.2.2 Uses advised against Group	Uses advised against			Jse descriptors	Use descriptors	
1.2.2 Uses advised against Group Consumer	Uses advised against			Jse descriptors	Use descriptors (ERC)	
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L L L Support Support Consumer Consumer Industrial Professional Consumer Industrial Professional Supplier of the supplier of Supplier of the susp	Uses advised against No uses advised against the safety data sheet: moor Geuaalijie Stoffen vav (Bio)		Public	Jse descriptors	Use descriptors (ERC) Article (AC)	
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- To be consistent with the GHS, the SDS must contain Sections 12-15.
- Although the headings for Sections 12-15 are mandatory, <u>OSHA will not enforce the</u> <u>content of these four sections</u> <u>because they are within other</u> <u>agencies' jurisdictions.</u>



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Impact of GHS



- OSHA estimates that over 5 million workplaces in the United States will be affected by the revised Hazard Communication Standard (HCS). These workplaces employ a total of approximately 43 million people, all of whom run the risk of exposure to hazardous chemicals.
- OSHA statistical models estimate_that the revised HCS will result in the prevention of approximately 43 fatalities and 585 injuries and/or illnesses annually.
- The University of Arkansas has begun implementing the GHS program on campus. The NFPA Diamond method of identifying chemical hazards will continue in use as well during the GHS phase-in process.





Additional information on the content and implementation GHS program can be found on the following links:

<u>http://www.osha.gov/dsg/hazcom/ghs.html</u> <u>http://www.msdsonline.com/resources/regulatory-information/ghs.aspx</u> <u>http://www.schc.org/pdf/fact_sheets/SCHC_GHS_FS3_What_is_the_GHS.pdf</u> <u>http://ghssafety.com/</u>

Some of the many options available for more in-depth GHS training can be viewed on the following links:

<u>http://ghssafety.com/</u> <u>http://etraintoday.com/course-catalog/osha-training/ghs-training/</u> <u>http://www.thecompliancecenter.com/training-courses/ghs/</u>