GHS is a topic that has been mentioned related to safety on campus in the last few months. Have you heard of it? Do you know what GHS stands for? Do you know why it is important? What, if any, implications does it have on your work and/or home environment? This edition of Health and Safety News seeks to answer those, as well as many other questions concerning this much talked about topic. The information in this month’s newsletter comes from the website of the Occupational Health & Safety Administration, commonly called OSHA (https://www.osha.gov/ and https://www.osha.gov/dsg/hazcom/ghs.html).

The Office of Environmental Health & Safety’s campus safety officer, Mike Stiles has been charged with educating the campus community about this significant change to OSHA’s hazard communications standard. Mr. Stiles began offering training courses in August and has thus far been able to reach hundreds of the university’s faculty, staff, and students. In addition to the face to face training offered, there is an online training available through the Office of Environmental Health & Safety’s website (http://ehs.uark.edu/). When asked for a statement about GHS, Mr. Stiles had this to say:

GHS is an abbreviation for Globally Harmonized System of Classification and Labeling of Chemicals, OSHA’s newest standard. It is expected to improve worker safety and health for approximately 43 million Americans. As an international approach to safety most countries in the world have agreed to use the new GHS. Its use will result in major changes for labeling, hazard classification, and new safety data sheets. Employers (the University) must train employees by December 1, 2013. Implementation of the standard is a multi-year process involving manufacturers, importers, and exporters as well as employers. The complete standard is effective June 1, 2016. The Arkansas Department of Labor
requires all state employees “exposed to chemicals in their workplace” be trained on the new GHS standard. The result will be employees have information about workplace chemicals that is more consistent, accurate and “user friendly.” OSHA estimates GHS will prevent 43 fatalities and 585 chemical injuries annually. We all come out ahead!

MB Stiles

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**GHS Facts**

**What is the Globally Harmonized System?**

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

**Why did OSHA decide to modify the Hazard Communication Standard to adopt the GHS?**

OSHA has modified the Hazard Communication Standard (HCS) to adopt the GHS to improve safety and health of workers through more effective communications on chemical hazards. Since it was first promulgated in 1983, the HCS has provided employers and employees extensive information about the chemicals in their workplaces. The original standard is performance-oriented, allowing chemical manufacturers and importers to convey information on labels and material safety data sheets in whatever format they choose. While the available information has been helpful in improving employee safety and health, a more standardized approach to classifying the hazards and conveying the information will be more effective, and provide further improvements in American workplaces. The GHS provides such a standardized approach, including detailed criteria for determining what hazardous effects a chemical poses, as well as standardized label elements assigned by hazard class and category. This will enhance both employer and worker comprehension of the hazards, which will help to ensure appropriate handling and safe use of workplace chemicals. In addition, the safety data sheet requirements establish an order of information that is standardized. The harmonized format of the safety data sheets will enable employers, workers, health professionals, and emergency responders to access the information more efficiently and effectively, thus increasing their utility.

Adoption of the GHS in the US and around the world will also help to improve information received from other countries—since the US is both a major importer and exporter of chemicals, American workers often see labels and safety data sheets from other countries. The diverse and sometimes conflicting national and international requirements can create confusion among those who seek to use hazard information effectively. For example, labels and safety data sheets may include symbols and hazard
statements that are unfamiliar to readers or not well understood. Containers may be labeled with such a large volume of information that important statements are not easily recognized. Given the differences in hazard classification criteria, labels may also be incorrect when used in other countries. If countries around the world adopt the GHS, these problems will be minimized, and chemicals crossing borders will have consistent information, thus improving communication globally.

**Why must training be conducted prior to the compliance effective date?**

OSHA is requiring that employees are trained on the new label elements (i.e., pictograms, hazard statements, precautionary statements, and signal words) and SDS format by December 1, 2013, while full compliance with the final rule will begin in 2015. OSHA believes that American workplaces will soon begin to receive labels and SDSs that are consistent with the GHS, since many American and foreign chemical manufacturers have already begun to produce HazCom 2012/GHS-compliant labels and SDSs. It is important to ensure that when employees begin to see the new labels and SDSs in their workplaces, they will be familiar with them, understand how to use them, and access the information effectively. For more information, [http://www.osha.gov/dsg/hazcom/effectivedates.html](http://www.osha.gov/dsg/hazcom/effectivedates.html).

**What are the major changes to the Hazard Communication Standard?**

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

- **Hazard classification:** The definitions of hazard have been changed to provide specific criteria for classification of health and physical hazards, as well as classification of mixtures. 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.
- **Labels:** 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.
- **Safety Data Sheets:** Will now have a specified 16-section format.

The GHS does not include harmonized training provisions, but recognizes that training is essential to an effective hazard communication approach. The revised Hazard Communication Standard (HCS) requires that workers be re-trained within two years of the publication of the final rule to facilitate recognition and understanding of the new labels and safety data sheets.

**How will labels change under the revised Hazard Communication Standard?**

Under the current Hazard Communication Standard (HCS), the label preparer must provide the identity of the chemical, and the appropriate hazard warnings. This may be done in a variety of ways, and the method to convey the information is left to the preparer. 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:

- **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.
- **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.

**What pictograms are required in the revised Hazard Communication Standard? What hazard does each identify?**

There are nine pictograms under the GHS to convey the health, physical and environmental hazards. The final Hazard Communication Standard (HCS) requires eight of these pictograms, the exception being the environmental pictogram, as environmental hazards are not within OSHA's jurisdiction. The hazard pictograms and their corresponding hazards are shown below.

<table>
<thead>
<tr>
<th>Health Hazard</th>
<th>Flame</th>
<th>Exclamation Mark</th>
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<tbody>
<tr>
<td>Carcinogen</td>
<td>Flammables</td>
<td>Irritant (skin and eye)</td>
</tr>
<tr>
<td>Mutagenicity</td>
<td>Pyrophorics</td>
<td>Skin Sensitizer</td>
</tr>
<tr>
<td>Reproductive Toxicity</td>
<td>Self-Heating</td>
<td>Acute Toxicity (harmful)</td>
</tr>
<tr>
<td>Respiratory Sensitizer</td>
<td>Emits Flammable Gas</td>
<td>Narcotic Effects</td>
</tr>
<tr>
<td>Target Organ Toxicity</td>
<td>Self-Reactives</td>
<td>Respiratory Tract Irritant</td>
</tr>
<tr>
<td>Aspiration Toxicity</td>
<td>Organic Peroxides</td>
<td>Hazardous to Ozone Layer (Non Mandatory)</td>
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<tr>
<th>Gas Cylinder</th>
<th>Corrosion</th>
<th>Exploding Bomb</th>
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<tbody>
<tr>
<td>Gases under Pressure</td>
<td>Skin Corrosion/ burns</td>
<td>Explosives</td>
</tr>
<tr>
<td></td>
<td>Eye Damage</td>
<td>Self-Reactives</td>
</tr>
<tr>
<td></td>
<td>Corrosive to Metals</td>
<td>Organic Peroxides</td>
</tr>
</tbody>
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<tr>
<th>Flame over Circle</th>
<th>Environment (Non Mandatory)</th>
<th>Skull and Crossbones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxidizers</td>
<td>Aquatic Toxicity</td>
<td>Acute Toxicity (fatal or toxic)</td>
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</tbody>
</table>

**Can I use a black border on pictograms for domestic shipment?**

Under the revised Hazard Communication Standard (HCS), pictograms must have red borders. OSHA believes that the use of the red frame will increase recognition and comprehensibility. Therefore, the red frame is required regardless of whether the shipment is domestic or international.
When must label information be updated?

In the revised Hazard Communication Standard (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 new 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 employer shall add the information to the label 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 Hazard Communication Standard (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. Alternative labeling systems such as the National Fire Protection Association (NFPA) 704 Hazard Rating and the Hazardous Material Information System (HMIS) are permitted for workplace containers. However, 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 (SDS) changing under the revised Hazard Communication Standard?

The information required on the safety data sheet (SDS) will remain essentially the same 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 Hazard Communication Standard (HazCom 2012) requires that the information on the SDS be presented using specific headings in a specified sequence.

Paragraph (g) of the final rule provides the headings of information to be included on the SDS and the order in which they are to be provided. In addition, Appendix D provides the information 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 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
The SDS must also contain Sections 12-15, to be consistent with the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS). Although the headings for Sections 12-15 are mandatory, OSHA will not enforce the content of these four sections because these sections are within other agencies' jurisdictions.

How has OSHA addressed pyrophoric gases, simple asphyxiants, and combustible dust?

In the revised Hazard Communication Standard (HCS), OSHA has added pyrophoric gases, simple asphyxiants and combustible dust to the definition of "hazardous chemical". OSHA has also added definitions to the revised HCS for pyrophoric gases and simple asphyxiants, and provided guidance on how to define combustible dust for the purposes of complying with the HCS.

- **Pyrophoric gases:**
  OSHA has retained the definition for pyrophoric gases from the current HCS. Pyrophoric gases must be addressed both on container labels and SDSs. OSHA has provided label elements for pyrophoric gases which include the signal word "danger" and the hazard statement "catches fire spontaneously if exposed to air".

- **Simple asphyxiants:**
  OSHA has revised the definition of simple asphyxiants that was proposed in the Notice of Proposed Rulemaking (NPRM) as a result of comments from the regulated community. In the final HCS, simple asphyxiants must be labeled where appropriate, and be addressed on SDSs. OSHA has provided label elements for simple asphyxiants which include the signal word "warning" and the hazard statement "may displace oxygen and cause rapid suffocation".

- **Combustible dust:**
  OSHA has **not** provided a definition for combustible dust to the final HCS given ongoing activities in the specific rulemaking, as well as in the United Nations Sub-Committee of Experts on the GHS (UN/SCEGHS). However, guidance is being provided through existing documents, including the Combustible Dust National Emphasis Program Directive CPL 03-00-008, which includes an operative definition, as well as provides information about current responsibilities in this area. In addition, there are a number of voluntary industry consensus standards (particularly those of the NFPA) that address combustible dust.

  In the final HCS, combustible dust hazards must be addressed on labels and SDSs. Label elements are provided for combustible dust in the final HCS and include the signal word "warning" and the hazard statement "May form combustible dust concentrations in the air".

For chemicals in a solid form that do not present a combustible dust hazard, but may form combustible dusts while being processed in normal downstream uses, paragraph (f)(4) of the HCS allows the chemical manufacturer some flexibility in labeling requirements. The manufacturer or importer to may transmit the label to the customer at the time of the initial shipment, but the label does not need to be included with subsequent shipments unless it changes. This provides the needed information to the downstream users on the potential hazards in the workplace, while acknowledging that the solid metal or other materials do not present the same hazards that are produced when these materials are processed under normal conditions of use.
What are the estimated benefits attributable to the revised Hazard Communication Standard?

OSHA expects that the modifications to the Hazard Communication Standard (HCS) will result in increased safety and health for the affected employees and reduce the numbers of accidents, fatalities, injuries, and illnesses associated with exposures to hazardous chemicals. The GHS revisions to the HCS standard for labeling and safety data sheets would enable employees exposed to workplace chemicals to more quickly obtain and to more easily understand information about the hazards associated with those chemicals. In addition, the revisions to HCS are expected to improve the use of appropriate exposure controls and work practices that can reduce the safety and health risks associated with exposure to hazardous chemicals.

OSHA estimates that the revised HCS will result in the prevention of 43 fatalities and 585 injuries and illnesses (318 non-lost-workday injuries and illnesses, 203 lost-workday injuries and illnesses, and 64 chronic illnesses) annually. The monetized value of this reduction in occupational risks is an estimated $250 million a year on an annualized basis.

OSHA estimates that the revised HCS will result in savings of $475.2 million from productivity improvements for health and safety managers and logistics personnel, $32.2 million during periodic updating of SDSs and labels, and $285.3 million from simplified hazard communication training.

OSHA anticipates that, in addition to safety and health benefits, the revised HCS will result in four types of productivity benefits: (1) for chemical manufacturers, because they will need to produce fewer SDSs in future years; (2) for employers, in providing training to new employees as required by the existing OSHA HCS through the improved consistency of the labels and SDSs. (3) for firms engaging in, or considering engaging in, international trade.

I understand that the United Nations revises the GHS every two years. How will OSHA manage and communicate changes to the Hazard Communication Standard?

It is expected that the GHS will be a living document and is expected to remain up-to-date and relevant; therefore further changes may be adopted on a two year cycle. Presently most of the recent updates have been clarification of text. However, OSHA anticipates that future updates of the Hazard Communication Standard (HCS) may be necessary and can be done through various rulemaking options, including:

- **Technical updates** for minor terminology changes,
- **Direct Final Rules** for text clarification, and
- **Notice and Comment rulemaking** for more substantive or controversial updates such as additional criteria or changes in health or safety hazard classes or categories.

For additional information, please visit OSHA’s website or contact Mike Stiles at (479) 575-7916.