



## How do the Hazard Communication Standard (HCS) and the Globally Harmonized System (GHS) Apply to Your Clients?

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The Hazard Communication Standard (HCS)—administered by the United States Occupational Safety and Health Administration (OSHA)—is designed to ensure the dissemination of information about chemical hazards and protective measures that can be taken by both employers and employees to safeguard health. The HCS is now aligned with the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals. This is a worldwide initiative to promote standard criteria for classifying chemicals according to their health, physical and environmental hazards. The HCS/GHS update provides a coherent approach to classifying chemicals and communicating hazard information on labels and safety data sheets. Its objective is to improve the quality and consistency of hazard information in the workplace. It also enhances the safety of all workers by providing understandable information and reducing international trade barriers for American businesses. As of 1 Dec. 2013, OSHA required all employers to have trained their employees on this update. University of Florida/IFAS Miami-Dade County Extension agents quickly responded to this need and delivered a series of trainings for employers and employees based on information on the OSHA website. Two-hundred-sixty-six (266) people participated in these trainings. For the English workshops, 139 participants used Turning Point™ pre- and post-tests to measure their knowledge of the new pictograms. Across all participants, there was a 6% increase in knowledge between the pre- and the post-test. Sixty-eight (68) of 79 (86%) participants in the Spanish workshops responded to a survey. All 68 reported a knowledge gain of 3.9 on a weighted scale of 1–5 and intent to change practices with regard to reading the label and using the new pictograms with a weighted average of 4.3 on a 1–5 scale. The satisfaction rating of these workshops was of 4.3 on a 1–5 scale. Participants reported being more confident in their ability to work with the new labels and Safety Data Sheets (SDSs) once they become available. All participants received a certificate of attendance and those with pesticide licenses received continuing education units.

The identification and regulation of every single chemical product that can cause a physical and/or environmental hazard is very difficult to achieve in many countries. In 1992, The United Nations Conference on the Environment and Development (Rio Earth Summit) developed a comprehensive international chemical classification and labeling system: the Globally Harmonized System (GHS).

In the United States, there are five agencies that regulate chemical exposure: the Department of Transportation (DOT) regulates chemical products transported on U.S. roadways, railways or airways; the Consumer Product Safety Commission (CPSC) is responsible for assuring that consumers are not exposed to hazardous products; the Environmental Protection Agency (EPA) is responsible for the registration and labeling of pesticides under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); the Food and Drug Administration (FDA) is responsible for regulating pharmaceutical and food additives or products and the Occupational Safety and Health Administration (OSHA), regulates the health and safety of U.S. workers (C. Winder et al., 2005).

### Globally Harmonized System (GHS)

The variety of classification and labeling systems used for chemical products and hazard classifications that has existed around the world has created confusion and added to the expense of these products. The Globally Harmonized System (GHS) of Classification and Labeling of Chemicals has the objective of improving the safety and health of workers through more effective communication about chemical hazards. The GHS is a system which standardizes and harmonizes the classification and labeling of chemicals. It provides worldwide guidelines for information about chemical products (The GHS and the Global Partnership).

Once changes are fully implemented, at least four main components will be standardized on chemical labels (e.g. pesticides): a) signal words; b) hazard statements; c) the use of pictograms; and d) a change from Material Safety Data Sheets (MSDSs) to Safety Data Sheets (SDSs) (Fig. 1, Fig. 2).

### Methods

The new system is currently being implemented throughout the world by countries including Canada, the European Union, China, Australia, and Japan. In late May 2013, OSHA set various compliance dates related to implementation of the GHS. The first provision is that all employers who use hazardous substances had to make sure that employees were trained on the new label

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**HCS Pictograms and Hazards**

<p><b>Health Hazard</b></p>  <ul style="list-style-type: none"> <li>• Carcinogen</li> <li>• Mutagenicity</li> <li>• Reproductive Toxicity</li> <li>• Respiratory Sensitizer</li> <li>• Target Organ Toxicity</li> <li>• Aspiration Toxicity</li> </ul>	<p><b>Flame</b></p>  <ul style="list-style-type: none"> <li>• Flammables</li> <li>• Pyrophorics</li> <li>• Self-Heating</li> <li>• Emits Flammable Gas</li> <li>• Self-Reactives</li> <li>• Organic Peroxides</li> </ul>	<p><b>Exclamation Mark</b></p>  <ul style="list-style-type: none"> <li>• Irritant (skin and eye)</li> <li>• Skin Sensitizer</li> <li>• Acute Toxicity</li> <li>• Narcotic Effects</li> <li>• Respiratory Tract Irritant</li> <li>• Hazardous to Ozone Layer (Non-Mandatory)</li> </ul>
<p><b>Gas Cylinder</b></p>  <ul style="list-style-type: none"> <li>• Gases Under Pressure</li> </ul>	<p><b>Corrosion</b></p>  <ul style="list-style-type: none"> <li>• Skin Corrosion/Burns</li> <li>• Eye Damage</li> <li>• Corrosive to Metals</li> </ul>	<p><b>Exploding Bomb</b></p>  <ul style="list-style-type: none"> <li>• Explosives</li> <li>• Self-Reactives</li> <li>• Organic Peroxides</li> </ul>
<p><b>Flame Over Circle</b></p>  <ul style="list-style-type: none"> <li>• Oxidizers</li> </ul>	<p><b>Environment (Non-Mandatory)</b></p>  <ul style="list-style-type: none"> <li>• Aquatic Toxicity</li> </ul>	<p><b>Skull and Crossbones</b></p>  <ul style="list-style-type: none"> <li>• Acute Toxicity (fatal or toxic)</li> </ul>

Fig. 1. As of 1 June 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. Source: <[https://www.osha.gov/Publications/HazComm\\_QuickCard\\_Pictogram.html](https://www.osha.gov/Publications/HazComm_QuickCard_Pictogram.html)>.

elements (i.e., pictograms, hazard statements, precautionary statements, and signal words) and SDS format by 1 Dec. 2013 with the final implementation in 2016 (Occupational Safety & Health Administration, U.S. Department of Labor <<https://www.osha.gov/dsg/hazcom/HCSFactsheet.html>>).

Given the short lead time for complying with the first phase of this rule, employers had only few months to come into compliance. This was complicated by the fact that no new labels or SDSs had even been developed at that point. A higher concern existed for Spanish speaking employers who needed an accurate and educational training on these rules which were only written in English.

University of Florida/Institute of Food and Agricultural Sciences (UF/IFAS) Miami-Dade Extension educators developed programs to help train employers so they could in turn train their employees before the 31 Dec. 2013 deadline. The three authors of this paper taught several classes in English and Spanish to professionals from different aspects of the agricultural and horticultural industries.

## Results

From July to Nov. 2013, 266 people from the private and public sectors received information about the OSHA update by attending at least one of the seven workshops offered by University of Florida/IFAS, Miami-Dade Extension educators.

For the English workshops, 139 participants used Turning Point™ pre- and post-tests to measure their knowledge of the new pictograms. Across all participants, there was a 6% increase in knowledge between the pre- and the post-test. Sixty-eight (68) of 79 (86%) participants in the Spanish workshops responded to a paper survey. All 68 reported a knowledge gain of 3.9 on a weighted scale of 1–5 and intent to change practices with regard to reading the label and using the new pictograms with a weighted average of 4.3 on a 1–5 scale. The satisfaction rating of these workshops was of 4.3 on a 1–5 scale.

A follow-up online survey had a 17 out of 150 (11%) response rate using (Qualtrics.com). It showed the following:

**OSHA** (800) 321-OSHA (6742)

**SAMPLE LABEL**

<p><b>PRODUCT IDENTIFIER</b></p> <p>CODE _____</p> <p>Product Name _____</p> <p><b>SUPPLIER IDENTIFICATION</b></p> <p>Company Name _____</p> <p>Street Address _____</p> <p>City _____ State _____</p> <p>Postal Code _____ Country _____</p> <p>Emergency Phone Number _____</p> <p><b>PRECAUTIONARY STATEMENTS</b></p> <p>Keep container tightly closed. Store in cool, well ventilated place that is locked. Keep away from heat/sparks/open flame. No smoking.</p> <p>Only use non-sparking tools. Use explosion-proof electrical equipment. Take precautionary measure against static discharge. Ground and bond container and receiving equipment.</p> <p>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.</p> <p><b>In Case of Fire:</b> use dry chemical (BC) or Carbon dioxide (CO<sub>2</sub>) fire extinguisher to extinguish.</p> <p><b>First Aid</b></p> <p>If exposed call Poison Center. If on skin (on hair): Take off immediately any contaminated clothing. Rinse skin with water.</p>	<p><b>HAZARD PICTOGRAMS</b></p>  <p><b>SIGNAL WORD</b></p> <p><b>Danger</b></p> <p><b>HAZARD STATEMENT</b></p> <p><b>Highly flammable liquid and vapor. May cause liver and kidney damage.</b></p> <p><b>SUPPLEMENTAL INFORMATION</b></p> <p><b>Directions for use</b></p> <p>_____</p> <p>_____</p> <p>Fill weight: _____ Lot Number _____</p> <p>Gross weight: _____ Fill Date: _____</p> <p>Expiration Date: _____</p>
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Fig. 2. Hazard Communication Standard Labels. As of 1 June 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. Source: <[https://www.osha.gov/Publications/HazComm\\_QuickCard\\_Labels.html](https://www.osha.gov/Publications/HazComm_QuickCard_Labels.html)>.

To the question: “Can you recognize the pictogram in a label after attending this OSHA class?”

9 out of 17 (53%) said Yes.

4 out of 17 (24%) responded that they will need more training to recognize a pictogram.

1 out of 17 (6%) said No. The remaining 3 (17%) didn't answer this question.

To the question: “Chose the pictogram that indicates hazard to the Environment”

16 out of 17 (94%) identified correctly the pictogram shown.

To the question: “Did you share this information with anyone else?”

13 out of 17 (76%) said Yes. From these 13 respondents, 11 (85%) shared with up to 5 people and 2 (15%) shared with more than 10 people.

All participants received a certificate of attendance and those with pesticide licenses received free Florida Department of Agriculture and Consumer Services (FDACS) Continuous Education Units (CEUs) at the completion of these classes.

## Conclusion

On 26 May 2013 the Occupational Safety and Health Administration, part of the U.S. Department of Labor, adopted the Globally Harmonized System, but the actual implementation of the changes in labeling and classification which make up this system will take a few years to be completed. Over 5 million workplaces in the United States will be affected by this revision

to the Hazard Communication Standard (HCS). These are the workplaces where approximately 43 million employees could be exposed to hazardous chemicals (Occupational Safety & Health Administration, U.S. Department of Labor <<https://www.osha.gov/dsg/hazcom/hazcom-faq.html#23>>).

In United States there are an estimated 650,000 hazardous chemical products or hazardous chemicals found in workplaces (Silk, 2003). The previous labeling and classification system did not assure standardized health and environment protections. In addition, the wide variety of languages, social conditions, literacy and type of profession increased the risk of exposure to these chemical products.

The results from pre- and post-workshop and the 6-month follow up surveys show some degree of knowledge gain and practice changes, but there are still many, many employees who need to learn about and come into compliance with the new regulations.

More workshops need to be conducted by University Extension educators during 2014 to address this requirement.

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