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GHS in the USA: Past, Present and Future

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Introduction

OSHA has proposed to modify the Hazard Communication Standard (29 CFR § 1910.1200) and the substance specific standards (29 CFR § 1910.1001-1052) to incorporate the Globally Harmonized System for the Classification and Labelling of Chemicals (GHS). A Notice of Proposed Rulemaking was issued on September 30, 2009.

This paper will provide a brief history of hazard communication in the United States, what the proposed rulemaking covers, and what potential changes there will be to the hazard communication standard in the future. It is important to note that, until the proposed rulemaking undergoes the entire rulemaking process and the adoption period has begun , the current Hazard Communication System (HCS) will remain in effect. The GHS uses the term Safety Data Sheets (SDS), as compared to the term Material Safety Data Sheets (MSDS); that terminology will be used for the remainder of this paper.

The Past

Brief History of Hazard Communication

Hazard communication regulations began to formally appear in the 1920s with the Federal Caustic Act of 1927. Other regulations followed; the Pure Food, Drug and Cosmetic Act of 1938 and the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) of 1948 established the basis for further regulations.

The chemical industry pursued a voluntary effort in the 1940s and the Manufacturing Chemist's Association created the Labels and Precautionary Information Committee. This committee published a manual titled *Warning Labels – Manual L-1-A – Guide for the Preparation of Warning Labels for Hazardous Chemicals* in 1945.

By the 1950s, there were calls for an international system for hazard communication and the International Labor Organization (ILO) had established a chemical committee to create a plan for chemicals to be labeled uniformly throughout the world (Mellan 14). The work of this committee also proposed the use of symbol for different hazard classes in 1955; some of these symbols are the basis for the current GHS symbols.

While hazard communication was not covered by a federal regulation until the 1980s, companies would voluntarily provide hazard communication information and labels to their customers. The *Manual L-1* was converted to an American National Standard Institute (ANSI) standard (Z129.1) in 1976. This voluntary consensus standard provided guidance to industry about how to label chemical products. However, not all companies were providing this information, which prompted OSHA to develop the HCS.

OSHA proposed the hazard communication standard in 1983 and, after the rulemaking process, it was adopted. This regulation covered several topics: material safety data sheets (MSDSs), training, hazard communication, and so on. The HCS phased in over two and a half years, and was promulgated for general industry in 1987. This performance standard provides flexibility for compliance, and does not require standardized wording or format for SDS. These sheets were intended to convey information about products, including hazardous ingredients, precautionary measures for handling, relevant first aid, and emergency information. While 29 CFR 1910.1200 provided no specific regulation as to layout of the MSDS, OSHA did provide Form 174 to aid with the development of these sheets (OSHA 1985). Form 174 provides for eight sections, including a general information section and the following: Hazardous Ingredients/Identity Information, Physical/Chemical Characteristics, Fire and Explosion Hazard Data, Reactivity Data, Health Hazard Data, Precautions for Safe Handling and Use, and Control Measures.

Industry in the United States felt the need for more guidance, and worked to revise the voluntary consensus standard for chemical product labels (ANSI Z129.1), and to write one for SDS (ANSI Z400). ANSI Z400.1 was first adopted in 1993 and has undergone two revisions, with the most recent revision issued in 2004. The 2004 version aligns the standard with the format of the GHS proposed in 2003.

Need for Harmonization

As the United States and other countries around the world created their own individual systems, the need for harmonization arose. While these systems are often similar in their approaches, the differences are significant enough to require multiple versions of labels and SDSs for trade between countries. For example, a chemical may have been classified as flammable in the country where it was produced, but not in the country to where it was shipped. Some chemicals may even have different hazard classifications within the same country, depending on which regulatory body covers the different stages of a product's life cycle. The concept behind the GHS is to provide a system to allow for the standardization of chemical hazard communication. It has the potential to impact every existing regulation, and to require changes to all countries' regulatory guidelines for hazard communication.

As an example of the differences that exist between the current regulatory systems, consider the example of classifying acute oral toxicity for the lethal dose for 50% of the population (LD_{50}) in Table 1.

Acute Oral Toxicity LD_{50} (mg/kg)										
Organization/Country/ Regulation or Standard	**High**			**Hazard**					**Low**	
	0			< 50			< 500		< 5000	
ANSI/US/A 129.1	< 50 Highly Toxic			> 50 < 500 Toxic			> 500 < 2000 Harmful			
OSHA/US/HCS	< 50 Highly Toxic			> 50 < 500 Toxic						
EPA/US/FIFRA	0 ≤ 50 Toxicity Category I			> 50 ≤ 500 Toxicity Category II			> 500 < 5000 Toxic Category III		> 5000 Toxicity Category IV	
CPSC/US/FHSA	< 50 Highly Toxic			> 50 ≤ 500 Toxic						
GHS	**≤ 5**	**> 5 ≤ 50**		**> 50 ≤ 300**			**> 300 ≤ 2000**		**> 2000 ≤ 5000**	
DOT/US	< 5 Picking Group 1	> 5 < 50 Picking Group II		> 50 < 200 (solid) > 50 > 500 (liquid) Picking Group III						
NFPA/US	≤ 5 Hazard Category 4	> 5 ≤ 50 Hazard Category 3		> 50 ≤ 500 Hazard Category 2			> 500 ≤ 2000 Hazard Category 1		> 2000 Hazard Category 0	
NPCA/US/HMIS	≤ 1 Toxicity Rating 4	> 1 ≤ 50 Toxicity Rating 3		> 50 ≤ 500 Toxicity Rating 2			> 500 ≤ 5000 Toxicity Rating 1		> 5000 Toxicity Rating 0	
EU	< 25 Very Toxic	> 25 > 200 Toxic			> 200 < 2000 Harmful					
WHMIS/Canada	≤ 50 Very Toxic WHMIS Class D, Division 1, Subdivision A			> 50 ≤ 500 Toxic WHMIS Class D, Division 1, Subdivision B						
Australia/NOHSC	< 25 Very Toxic	> 25 < 200 Toxic			> 200 < 2000 Harmful					
Mexico	<1 Extremely Toxic	>20 < 50 Highly Toxic		> 50 < 500 Moderately Toxic			> 500 < 5000 Mildly Toxic			
Malaysia	< 25 Very Toxic			200 to 500 Harmful						
Japan	< 30 Poisonous						300 to 3000 Powerful			
Korea	< 25 Very Toxic	> 50 < 200 Toxic			> 200 < 2000 Harmful					

Table 1. Acute Oral Toxicity Classifications for Existing Systems Based on LD_{50} (mg/kg). (OSHA 2006b)

None of the fifteen different organizations/countries/regulations/standards systems above are in agreement on the way to classify this one piece of information. The ranges specified under each system result in the need for a separate label and SDS for each classification system. There are at least seven systems within the United States that could impact a given product, and even those are not aligned: ANSI Z129.1, the Occupational Safety and Health Administration (OSHA), the Environmental Protection Agency (EPA), the Consumer Product Safety Commission (CPSC), the Department of Transportation (DOT), the National Fire Protection Association (NFPA), and the National Paint & Coatings Association (NPCA).

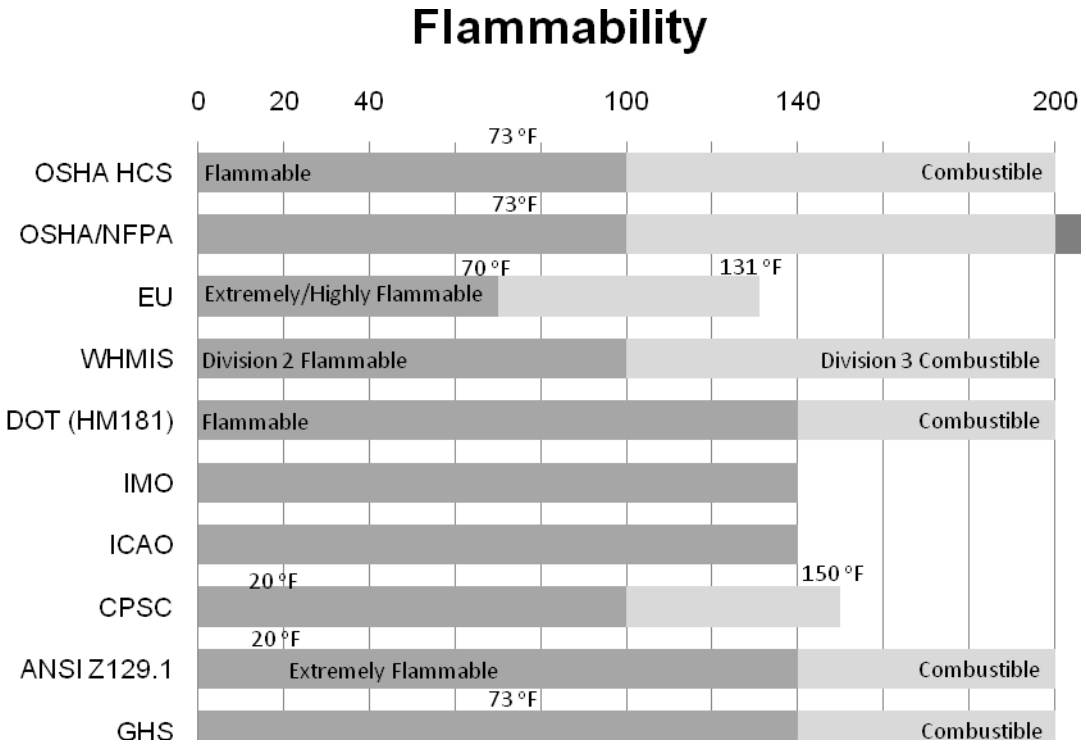

Figure 1. Flammability Classifications for Existing Systems Based on Flash Point of the Material. (OSHA 2006b)

Now consider a similar attempt at classification of a flammable material. Figure 1shows the classifications for flammability in ten different systems. The flash point of the material determines the classification in various systems, but a material with a flash point of 155°F would be considered combustible by OSHA and NFPA, but not classified by the European Union (EU), International Maritime Organization (IMO) or International Civil Aviation/International Air Transport Organization (ICAO/IATA) systems. The U.S. Consumer Products Safety Commission (CPSC) would not classify the material, which shows again, even within the United States, the classification schemes are not aligned with each other.

The two examples for LD_{50} and flammability demonstrate how a SDS would need to be modified for trade involving one or more of the above classification systems. Given the numerous types of information conveyed by the SDS, the need for harmonization becomes clear.

The current situation results in the need for multiple versions of SDS and labels depending on the systems adopted by the different regions and stages of the product lifecycle.

Harmonization will also benefit trade between countries because complying with multiple regulations regarding hazard classification and labeling is costly and time-consuming. The regulatory burden of compliance places small and medium-sized businesses at a disadvantage in international trade.

The Development of the GHS

The first reference to a harmonized system for hazard communication by the United Nations (UN) was in 1992 at United Nations Conference on Environment and Development (UNCED), as stated in paragraphs 26 and 27 of the Agenda 21, Chapter 19, Programme Area B, reproduced below (UNCED 1992).

> 26. Globally harmonized classification and labeling systems are not yet available to promote the safe use of chemicals, inter alia, at the workplace or at the home. Classification of different chemicals can be made for different purposes and is a particularly important tool in establishing labeling systems. There is a need to develop harmonized classification and labeling systems, building on ongoing work;
>
> 27. A globally harmonized hazard classification and compatible labelling system, including material safety data sheets and easily understandable symbols, should be available, if feasible, by the year 2000.

Over the next decade, the United States delegation (represented by OSHA, labor, and industry) to the Interorganization Programme for the Sound Management of Chemicals (IOMC) and other delegations from countries around the world worked to create the framework for the GHS. The IOMC used several existing systems as the basis for the GHS that were identified in an International Labor Organization (ILO) report, including the UN Transport Recommendations, European Union Directives on Substances and Preparations, Canadian Requirements for workplace, consumers and pesticides, and United States requirements for workplace, consumers and pesticides (Silk 448). A key aspect that assured both countries and other major stakeholders was an agreement that protections would not be reduced through the harmonization process (Silk 448). The first edition of the GHS, which was intended to serve as the initial basis for the global implementation of the system, was approved by the Committee of Experts in December 2002 and published in 2003 (UNECE 2009).

The GHS is a voluntary, international system, and there are no binding treaty obligations. However, as countries adopt the GHS into their regulatory frameworks, there will be binding regulatory changes for industry. The classification logic for hazards, signal words, hazard pictograms and hazard statements have been standardized and harmonized, but there are still sections that have not been harmonized. The precautionary statements and the potential inclusion of precautionary pictograms have not been agreed upon.

The UN subcommittee continues to modify the GHS, and has been releasing new versions of the purple book on a biennial basis. This is similar to the approach the UN has taken with the transportation of dangerous goods, referred to as the "Orange Book." The Orange Book is currently in its sixteenth edition. The latest version of the "Purple Book" was released in 2009, and is the basis for OSHA proposed changes to the HCS.

The Building Block Approach for GHS

The GHS itself is not a regulation or a standard, but contains the building blocks for a hazard communication system. These building blocks provide the informational framework upon which countries can base programs for the sound management of chemicals.

Although countries have adopted the GHS as part of their national regulations, not all countries are aligned with each other. This is because countries can determine which of the building blocks will be applied in different parts of their systems. Hazard classes are building blocks and, within a hazard class, each category can be considered a separate block. When a regulatory scheme covers something that is in the GHS, and implements the GHS, that coverage should be consistent. Once an endpoint and subclasses are selected, as needed, the GHS classification criteria, assigned label elements and SDS provisions should be followed as specified in the GHS. If a regulatory system covers carcinogenicity, for example, it should follow the harmonized classification scheme, the harmonized label elements and, where appropriate, the SDS (OSHA 2006b).

GHS: A Hazard-based Approach

The GHS uses a classification system based on the inherent hazards of the material. The hazards lead to a classification which has been assigned signal words, hazard symbols, hazard statements, and precautionary statements.

Those elements should be present on the label and on the SDS in Section 2. The GHS hazard pictograms, signal word, and hazard statements should be located together on the label. The actual label format or layout is not specified in the GHS. National authorities may choose to specify where information should appear on the label or allow supplier discretion (OSHA 2006b).

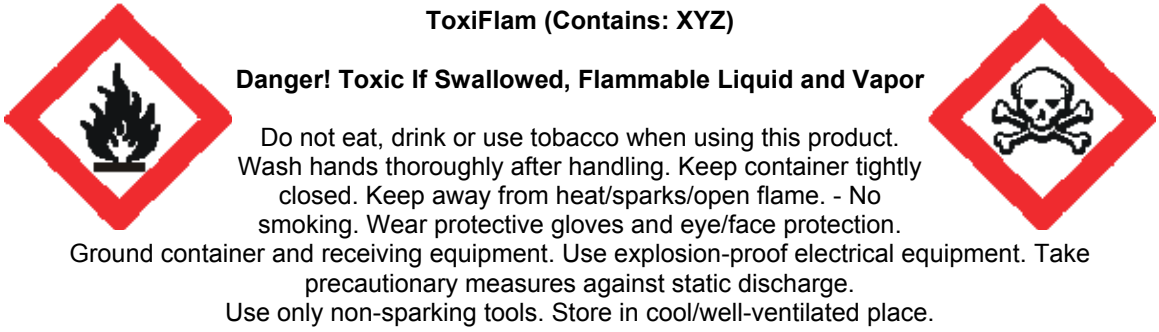

Figure 2. This shows an example of a GHS label for the fictional product 'ToxiFlam.' (OSHA 2006b)

Regulatory Activity in the U.S.

To signal its intent to change the HCS, OSHA issued an Advanced Notice of Proposed Rulemaking (ANPR) on September 12, 2006 (OSHA 2006a). Over 100 public comments were submitted for the ANPR.

The US Department of Transportation (DOT) has completed the modification of its regulations to align with the GHS. HM-215I aligned with Class 3- Flammable Liquids and Division 6.1 with the GHS. The final rule updated 49 CFR to align with 14th edition UN model regulations and international model regulations. These changes include revision for the Organic Peroxide label and placard, revision of the classification criteria for Class 3 PG III flammable liquids, and revision of the classification criteria and packing group assignments. The transition period will end on January 1, 2012; until that time, the use of Class 3 and Division 6.1 classification criteria and packing group assignments in effect on December 31, 2006, may continue.

The Environmental Protection Agency (EPA) issued a white paper in August of 2004, and performed a side-by-side comparison of the current regulation with the GHS. While the adoption of the GHS will require changes to the regulations, the EPA has yet to propose these changes.

The Consumer Product Safety Commission (CPSC) intends to follow the risk-based labeling option specified in Annex 5 of the GHS. Implementation will likely involve both regulatory and statutory amendment, but the rulemaking process has yet to begin.

The Present

OSHA issued a Notice of Proposed Rulemaking (NPRM) for GHS on September 30, 2009. The rulemaking includes modifications to the HCS (29 CFR § 1910.1200), and the substance specific standards (29 CFR. § 1910.1001-1052), incorporate the selected building blocks of the GHS.(OSHA 2009) The OSHA NPRM does not cover environmental hazards, which fall outside of OSHA's jurisdiction.

The NRPM proposes a change in language for the definition of flammables. This definition is used to determine the scope of the Process Safety Management (PSM) regulation (29 CFR § 1910.119). At this time, OSHA has proposed to modify the language of the PSM regulation as to not change the scope.

The comment period for written comments to be added to the docket ended at the end of 2009. Over 100 comments were submitted for the NPRM in 2009; public comments were added to the docket for the GHS; and the next step is a series of three public meetings that will occur in the Spring of 2010. After the public meetings have concluded, OSHA will respond to the written comments and the comments from the public meeting in the Federal Register before issuing a final rule for hazard communication.

The Future

Once the rulemaking process is complete, OSHA will issue a final rule for the changes proposed to modify the HCS to incorporate the GHS. The final rule may differ in some respects from the proposed rule, based on the comments OSHA received during the comment period and the public meetings. At that point, the transition period specified by OSHA in the final rule will begin. It is only at that point in the future can companies use the GHS approach to classify materials, and use GHS format labels and SDS. While the revised HCS will change the existing regulation, there

probably will continue to be an ANSI voluntary consensus standard to provide additional guidance and additional materials from OSHA to assist with interpretation of the final rule.

Conclusion

We can only speculate that, once the rulemaking process is complete, OSHA will issue a final rule to modify the current HCS and incorporate the GHS, which could occur before the end of 2010. The issuing of the final rule does not mean OSHA will begin enforcing the rule, but it will start the clock for the transition period that OSHA will specify in the final rule. Once the transition period is complete, OSHA will begin to enforce the proposed changes to the HCS; in addition, the EPA and the CPSC will probably modify their rules and regulations in the near future.

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