Health & Safety Committee

Revised OSHA Hazard Communication Standard Improves Chemical Label Information–Changes You Need to Know

In 2012, OSHA revised its Hazard Communication Standard (29 CFR 1910.1200) to align it with the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS). A worker's basic right to know remains the same: every manufacturer and importer must still evaluate their chemicals and provide hazard information to employers and workers on labels and material safety data sheets (now called Safety Data Sheets); employers must still train their workers in these hazards and how best to protect themselves from injury or illness by using the chemicals safely.

However, the revised standard now specifies more detailed label information, including the use of pictograms and quick visual notations, to provide more immediate hazard recognition and enhanced worker comprehension, regardless of language barriers. Labels now must provide instructions so that workers are clearly informed on how to protect themselves when handling the chemical and its container. Chemicals are now classified on a standard international scheme, resulting in hazard information that is consistent worldwide.

The AIC Health and Safety Committee has collected information to familiarize you with these important changes and the wealth of detailed facts that will be on new Safety Data Sheets and container labeling. All users of chemicals in a workplace (including employees, volunteers, interns, visiting scientists, contractors working around your chemicals) were to have already received training from their employer as of December 1, 2013; these employers are legally out-of-compliance until worker training is completed and documented in their employee files. Private practice conservators need to train themselves as soon as possible. This not only protects their health and safety, but also will ensure they comply with legal obligations to train any student interns, apprentices, or other contractors they may hire or sponsor. A host of valuable training tools and fact sheets that easily explain each change can be found on OSHA's website (see box).

Why the Change? What Will Labels and Pictograms Look Like?

By Michael Hunt, CIH, Industrial Hygienist, Smithsonian Institution Office of Safety, Health and Environmental Management

In the year and a half since the U.S. Department of Labor (DOL) changed the Federal OSHA Hazard Communication standard (HazCom), conservators have been asking their industrial hygienists and other safety professionals many pertinent questions, such as, "What are these new pictograms?" and, "Why would OSHA change one of the most successful safety standards?" Sometimes with less pleasure, we get asked, "Why is retraining of our staff necessary?," which is usually accompanied with the comment, "this is very time consuming." The old HazCom standard had, after all, been a linchpin of museum safety programs for almost 20 years. Why the need for a change? The answer to these questions is that the core changes to the standard (e.g., the new labels and pictograms) are really all about symbols and their power to communicate, and more specifically the need for symbols to communicate safety information in a standardized fashion across international borders.

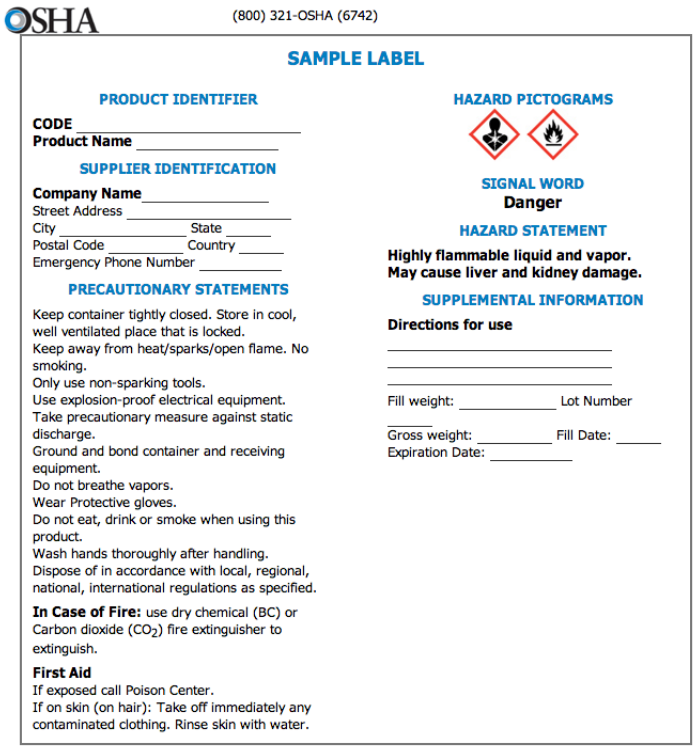
Consider the new skull and crossbones pictogram, which references a chemical product having acute toxicity. This symbol already has some cultural significance; possibly evoking images of pirates, and walking the plank. Because many of us probably read *Treasure Island* as children and are familiar with this symbol, we can surmise that we need to be careful when handling this product. However, when we look at the other eight new pictograms, such as the exclamation mark pictogram, or the health hazard pictogram, their meaning may be unclear without training. What purpose could be served by creating new unclear symbols? To understand, you have to consider the challenges caused by the numerous country-specific safety labels and symbols within the context of an increasingly trans-national world. Consider the now retired European Union "harmful" symbol (a simple X in a box). A local U.S. chemical manufacturer was required to apply this symbol on the labels of certain products bound for France, knowing that the message would be lost on its American audience. Conversely, Americans working in foreign countries would purchase chemicals whose labels might not contain any hazard warning information at all, or be classified with unrecognizable international hazard symbols. Over time, it seems, the classification and labeling of chemical products has evolved differently throughout the world. Would it not be better to create one standard set of symbols and labels?

At the 1992 Earth Summit in Rio de Janeiro, it was decided to harmonize the classification and labeling of chemicals. After considering the weaknesses and strengths of the various symbols, the technical committee responsible for the revision settled on standard language that they disseminated in the form of the "UN Purple Book." The United Nations (UN) recommended that countries without standards adopt the new standardized classification and labeling scheme. For nations where standards were already present, such as the U.S., the UN suggested that the existing standards be "harmonized" with the recommendations of the Purple Book. The DOL agreed to follow suit with the UN recommendations; and, after six years in the rulemaking process, it promulgated the new HazCom standard in March 2012. Manufacturers will be expected to comply with all modified provisions of the final rule by June 2015. However, because these new symbols are already being used throughout the world, worker training in the U.S. was to have been completed by December 2013.

Conservators need to be cognizant of the three major "communication" changes: label requirements, pictograms, and updated Safety Data Sheets.

Labels for a hazardous chemical must contain (see fig. 1):

- Manufacturer or importer contact information (name, address, telephone).
- Product Identifier (code or batch number, also listed on SDS Section 1).
- Signal Words, and there are only two: "Danger" for severe hazard or "Warning" for less severe.
- Hazard Statement, describing the hazard nature and degree, per classifications listed in the Standard and its



OSHA (800) 321-OSHA (6742)

SAMPLE LABEL

PRODUCT IDENTIFIER

CODE _____
Product Name _____

SUPPLIER IDENTIFICATION

Company Name_____
Street Address _____
City _____ State _____
Postal Code _____ Country _____
Emergency Phone Number _____

PRECAUTIONARY STATEMENTS

Keep container tightly closed. Store in cool, well ventilated place that is locked.
Keep away from heat/sparks/open flame. No smoking.
Only use non-sparking tools.
Use explosion-proof electrical equipment.
Take precautionary measure against static discharge.
Ground and bond container and receiving equipment.
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.

In Case of Fire: use dry chemical (BC) or Carbon dioxide (CO_2) fire extinguisher to extinguish.

First Aid
If exposed call Poison Center.
If on skin (on hair): Take off immediately any contaminated clothing. Rinse skin with water.

HAZARD PICTOGRAMS

SIGNAL WORD
Danger

HAZARD STATEMENT

Highly flammable liquid and vapor.
May cause liver and kidney damage.

SUPPLEMENTAL INFORMATION

Directions for use

_____
_____
_____

Fill weight: _____ Lot Number _____
Gross weight: _____ Fill Date: _____
Expiration Date: _____

Figure 1. OSHA Sample Label, https://www.osha.gov/Publications/HazComm_QuickCard_Labels.html

OSHA QUICK CARD

Hazard Communication Standard Pictogram

As of June 1, 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.

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 ▪ 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 (fatal or toxic)

For more information:
OSHA® Occupational Safety and Health Administration
U.S. Department of Labor
www.osha.gov (800) 321-OSHA (6742)

OSHA 3491-02 2012

Figure 2. OSHA Pictograms. https://www.osha.gov/Publications/HazComm_QuickCard_Pictogram.html

Effective Dates

The table below summarizes the phase-in dates required under the revised Hazard Communication Standard (HCS):

Effective Completion Date	Requirement(s)	Who
December 1, 2013	Train employees on the new label elements and safety data sheet (SDS) format.	Employers
June 1, 2015 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

Figure 3. Effective dates of the new standard. https://www.osha.gov/dsg/hazcom/effectivedates.html

Appendices. For example: "Causes damage to kidneys through prolonged or repeated exposure when absorbed through the skin."

- Precautionary Statements describing recommended measures to be taken to minimize/prevent adverse effects from exposure or improper storage or handling. There are four types: prevention, emergency response, storage, and disposal. The manufacturer may also include supplementary information, such as gloves-needed or percentage of some highly toxic ingredient.
- Pictograms: graphic symbols communicating the hazard, conforming to GHS and used world-wide.

Source: https://www.osha.gov/dsg/hazcom

It is going to take a little while to get used to the nine new **pictograms** (see fig. 2). In addition to the skull and crossbones, health hazard, and exclamation mark pictograms, there are pictograms to represent products toxic to aquatic life, explosives, oxidizers, gases under pressure, corrosives, and flammables.

It is worth pointing out that there is some firm logic behind these pictograms (outlined in Appendix C of the HazCom Standard at https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099). Chemical products are sorted with the appropriate pictograms, depending on the chemical properties or toxicology of the product. For example, a manufacturer of toluene will need to apply a flammable pictogram to their container label because the flash point and boiling point of the chemical lie within the range of flammable category #2 (i.e., flash point < 73.4F, boiling point > 95F).

The third major change to the HazCom Standard: you will get used to pulling out **Safety Data Sheets (SDS's)** instead of Material Safety Data Sheets (MSDS's) with your chemical shipments. The new SDS contains additional information sections (16 in total) and aligns with the pictogram and label information changes on the matching chemical container.

Employer Responsibilities for Updating Labels and SDS before June 1, 2016.

The effective dates of the new standard (see fig. 3) includes employee training (by December 1, 2013), manufacturer updating/modifying their labels and SDSs (June 1, 2015), complete compliance by employers and users for having updated labels on containers, and new SDSs on file. OSHA realizes that there will be a transition period in which you may have chemicals with both the old and new labels formats.

However, as soon as you or your employer begin receiving new SDSs or other updated hazard information, you must share that information with all employees so they are properly trained, until a new order of that chemical arrives with its updated GHS label.

To bridge the information gap between current older labels on your shelves, we recommend that you pro-actively obtain new SDSs now by calling the manufacturer or looking on their website. Most websites post all the SDSs. Be sure that you are obtaining the correct SDS for exactly the chemical on your shelf! Many have various additives or formulations, so double-check. When in doubt, call the company directly.

In addition, employers may continue to use rating systems such as the National Fire Protection Association (NFPA) diamond or Hazardous Materials Identification System (HMIS) requirements for workplace labels, as long as they are consistent with the requirements of the Hazard Communication standard and employees have the same immediate access to specific hazard information (i.e., new labels, SDSs, pictograms).

—Members of the AIC Health and Safety Committee

Have a question about health and safety in your conservation work? Send it to us at HealthandSafety [at] conservation-us.org.

HazCom 2012 and Changes To Chemical Labeling for Conservators in Private Practice

By Corey Smith Riley, Riley Art Conservation Services, Raleigh, NC

As a conservator in a small private practice, I do not legally fall under the OSHA training regulations in regards to the new labeling system nor have I had the organized training that was required by December 1, 2013. This is not an excuse to be uninformed about the HazCom 2012 label changes on some chemicals shipped today and required on all chemicals shipped after June 1, 2015. Even without a formal in-person training, conservators such as myself can easily become educated about the changes to chemical labeling and the new pictograms from three very valuable links on the GHS page of the OSHA website. I encourage any conservators in practices that do not have official training provided for them to take a look at the following resources, which are listed below in order of usefulness.

OSHA Brief on Labels and Pictograms. This nine-page pdf is extremely valuable in explaining the new labeling elements, identifying what goes on a label and describing what the new pictograms are and how to use them.

https://www.osha.gov/Publications/OSHA3636.pdf

Downloadable 2013 Hazard Communication Presentation. This 61-slide Power Point presentation on "Hazard Communication Standard 2012: One Year of Implementation" essentially provides the full training on the labeling changes that you would receive in an official OSHA training class. The presentation is geared towards the trainers teaching the new standards classes and includes information on 2013 training requirements, updates on implementation issues, and resources for compliance. This presentation also includes information on the new 16-section safety data sheet (SDS) that will replace MSDS.

https://www.osha.gov/dsg/hazcom/webinar/schc_webinar_72513_clean.pptx

Downloadable Hazard Communications 2012 Presentation. This 61-slide Power Point presentation highlights the differences between the HazCom 1994 standards and the HazCom 2012 standards, and covers what changes can be expected in the workplace. These comparisons are presented in a clear bullet-point form. The presentation also includes a list of effective dates for HazCom 2012 implementation.

https://www.osha.gov/dsg/hazcom/schc_alliance_webinar_20120809/schc_alliance_webinar_20120809.pptx

New Materials and Research

Characterization of Asian and European Lacquers

Over the last several years, the Getty Conservation Institute's project on the Characterization of Asian and European Lacquers has made substantial advances in the methods used for the technical study of lacquer-based materials. Starting in 2008, Michael Schilling and Arlen Heginbotham began collaborating as a scientist/conservator team to study pieces of 17th and 18th century lacquer from Japan, China, and France in the J. Paul Getty Museum's decorative arts collections. Since then, the project has developed new methods and procedures for sampling and organic analysis that can provide surprisingly detailed information about the fabrication methods and materials used in Asian and European lacquers. Because lacquer objects tend have complex and highly varied layer structures, the team decided early on to take a "micro excavation" approach to sampling, carefully separating the sample material by layer under the microscope, often with the aid of ultraviolet illumination. They then use pyrolysis-gas chromatography/mass spectrometry (Py-GC/MS) to analyze each layer individually to determine its organic constituents (along with certain inorganic components as well). This method, when combined with a chemical pre-treatment of the sample with tetramethylammonium hydroxide (TMAH), allows for a remarkably wide range of compounds to be detected from a single analysis. Not only can the three primary regional types of Asian lacquers be detected and disambiguated (these are the so-called "anacard" lacquers: urushi, laccol, and thitsi), the technique can also identify a variety of natural resins, oils, starches, proteinaceous materials, inorganic additives, and more.

Over time, the project has built up an extensive reference material collection of fresh and aged materials used in the production of lacquer in different regions and time periods. By analyzing these reference materials with Py-GC/MS, the team has built up a database of molecular "marker" compounds associated with each. Now, using a semi-automated search protocol developed at the Getty, each new sample taken from a lacquer