



Working Together

Author(s): Guy Colonna Published on May 1, 2013
 2013 NFPA CONFERENCE + EXPO RUNDOWN
 Working Together

Can the hazard labeling guidelines in NFPA 704 exist side by side with the new “globally harmonized” provisions adopted by OSHA?



NFPA Journal®, May/June 2013

By Guy Colonna, P.E.

For decades, [NFPA 704. Identification of the Hazards of Materials for Emergency Response](#), has provided guidance for labeling an assortment of physical and chemical hazards with information on their flammability, instability, and potential impact on the health of people who come in contact with them. The labels, which use a combination of color coding and numerical scales to describe a hazard's severity, can appear on buildings, shipping containers, 55-gallon drums, aboveground storage tanks, and elsewhere. They are readily recognized and easily understood, and they are designed to help determine an appropriate response in the event of fire, spill, or similar emergencies. NFPA 704 labeling is used widely in a number of industries, and the Occupational Safety and Hazard Administration (OSHA) has allowed its use for in-plant labeling systems.

But a recent move by OSHA has introduced the possibility for confusion around the standard's labeling guidelines. Last year, OSHA updated its Hazard Communication Standard (HCS, or HazCom 2012) for general industry, which is required to be followed in all workplaces. The update included an adoption of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) into the HCS's new requirements applicable for U.S. workers and workplaces.

The GHS is an international effort that, like NFPA 704, provides a standardized approach to classification and labeling of hazardous chemicals, including detailed criteria for determining the dangers posed by chemicals and standardized label elements assigned by hazard class and category. But the GHS guidelines incorporated into the HCS differ in fundamental ways from the hazard identification and rating system in NFPA 704, including how the numerical rating scale is organized. OSHA has allowed the NFPA 704 system to remain in workplaces as long as employees are trained on how to understand and use both systems, but concerns have arisen over the possibility for confusion between the two.

NFPA and OSHA are now working to reconcile possible problems by developing a fact sheet that highlights the purposes and differences for each system. The organizations are also working jointly to promote awareness of the applicability for each system so that employers and workers can be trained on how to effectively comply with both.

Recognizing hazards

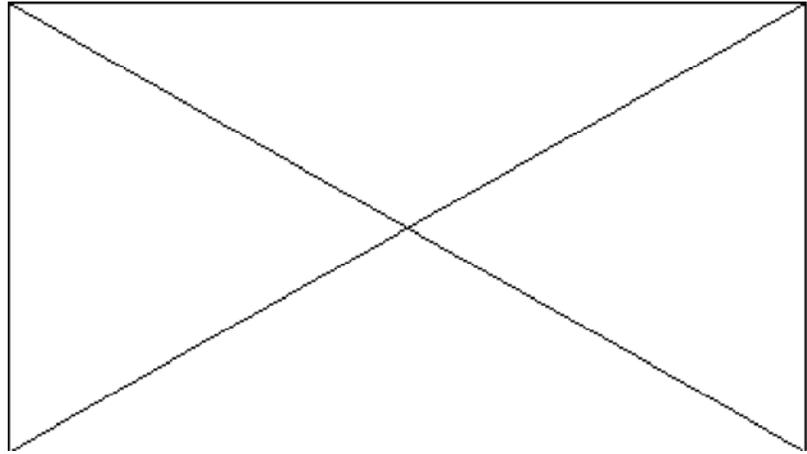
The objectives of the NFPA 704 labeling system include providing an appropriate signal or alert, assisting in planning for effective fire and emergency control operations, and assisting personnel in evaluating hazards. Besides labeling containers and various occupancies where hazardous materials are stored, handled, or used, applicable building or fire codes utilize the NFPA 704 hazard ratings to trigger additional protection measures, such as ventilation for materials that pose a health hazard.

The standard grew out of work that began in the 1950s, when the NFPA Sectional Committee on Classification, Labeling, and Properties of Flammable Liquids determined that classification of flammable liquids had not been standardized. The committee expressed interest in a broader view of characterizing the fire hazards for all materials, and presented a plan for addressing this broader question in its report at NFPA's Annual Meeting in 1956. The plan outlined a hazard classification system consisting of three categories — flammability, reactive stability, and health — and a relative rating scale for indicating hazard severity for each. The committee proposed that the hazard information be presented by a simple means — red for flammability, yellow for stability, and blue for health — and initially proposed a colored band, circle, or geometric shape where each hazard category would have its own color. The committee presented an additional update on its work during the 1958 Annual Meeting and summarized its objectives for the project. "The committee hopes that it will be able to draft a method of identifying the fire hazards of all types of materials which will be so helpful that not only other NFPA committees but other agencies interested in safety will find the identification method so advantageous that it will have world-wide acceptance," wrote J.S. Queener, the committee chair, in NFPA Quarterly in 1958.

Queener had previously written in NFPA Quarterly that "if standardization can be effected it should be a real service to the process designer, transportation and storage groups, the underwriter, inspection and fire protection authorities, and the firefighter." He and the committee recognized that using a standard means for identifying and classifying the hazard properties of all materials would make it attractive and facilitate the actual implementation of such a system within a facility. In 1961, NFPA issued the first edition of NFPA 704M, Recommended System for the Identification of the Fire Hazards of Materials. Two core components essential to the system are its focus on the inherent hazards of any material and the emphasis on acute hazards rather than chronic hazards. Acute hazards are characterized by single exposure and immediate effects, while chronic hazards require repeated exposures with a delay in the appearance of effects. The first edition of NFPA 704 also introduced the readily recognized hazard labeling symbol — the diamond, or more correctly, the square-on-point design that has become one of industry's most recognizable hazard warnings.

OSHA first introduced hazard communication requirements in 1983, including hazard identification in the form of material safety data sheets and labeling, a listing of chemicals, and worker training. HazCom differed from NFPA 704 in its provisions that addressed the broad range of workplace hazards, both acute and chronic, as opposed to the acute emergency-response

YOUTUBE VIDEO



NFPA's Guy Colonna highlights a key difference between OSHA's new "globally harmonized" hazard warnings and NFPA 704.

SIDEBAR



[Two Approaches. One Hazard](#)

The compound epichlorohydrin is used in a variety of industries for the production of glycerol, plastics, epoxy glues and resins, and elastomers. It is highly reactive and is a

significant health hazard.

2013 NFPA CONFERENCE + EXPO



[2013 NFPA Conference + Expo](#)
[NFPA Conference Schedule](#)
[NFPA Conference + Expo Blog](#)

RELATED CONFERENCE SESSIONS

HazCom 2012 Changes —
 What and When
 Monday, June 10, 8–9 a.m.

Diamonds Are Forever! NFPA 704 in a
 Globally Harmonized World
 Tuesday, June 11, 11 a.m.–12:30 p.m.

related hazards addressed by NFPA 704. The NFPA system enjoys a much broader application as a hazardous chemical information resource than originally envisioned. Much of that increased use occurred during the 30 years following the issuance of the original HCS standard by OSHA in 1983. Since then, employers have utilized the NFPA 704 system widely in their efforts to comply with the HCS requirement for educating employees. Because the NFPA 704 system limits its application to acute hazards, it would not be sufficient to comply with the HCS requirements without some augmentation. OSHA acknowledged that employers could use the NFPA 704 system as a HazCom compliance resource, provided their program addressed the differences between the systems and employees received training on those differences.

In the 1980s, the United Nations began holding discussions on the creation of a new “globally harmonized system,” a single system for evaluating and identifying chemical hazards that would be adopted and used to protect workers and the environment worldwide. OSHA represented the United States during these negotiations. The result was the set of guidelines described in the U.N. document “Globally Harmonized System of Classification and Labeling of Chemicals,” commonly referred to as The Purple Book, published in 2005 and available online at unece.org. The new guidelines provide criteria for substance classification according to their physical, health, and environmental hazards, as well as hazard communication elements, including labeling and safety data sheets. Since OSHA represented the U.S. in this international forum, it proposed to introduce the new guidelines through the modifications it made last year to its HazCom document.

Overlap and conflict

The diverse and sometimes conflicting national and international requirements can create confusion among those who seek to use hazard information effectively, and the publication of HazCom 2012 created concern and confusion regarding several key aspects of hazard communication requirements. Because NFPA 704 had previously been accepted as a resource for HazCom compliance, employers were unclear whether that would continue with the updated regulation, and it has. Material safety data sheet preparers and users wondered whether the NFPA 704 hazard ratings would still be included, now that HazCom 2012 had adopted the more prescriptive format and content offered by adoption of GHS, and it has.

A significant area of concern was the GHS hazard category numerical values, which are inverted from the NFPA 704 hazard ratings. A material having an NFPA 704 health hazard rating of 3 or 4 represents serious to severe health hazard characteristics; the most severe rating in the GHS system is 1, with 3 or 4 representing moderate to minor hazards. Problems could arise if users are not aware of the source of a particular rating and make an incorrect decision based on their understanding of the numerical value. Additionally, the GHS health hazard criteria thresholds use different end points than those in NFPA 704. This causes some materials evaluated using GHS to yield a less hazardous health category than that obtained for the same material using the NFPA 704 criteria.

To address these issues and others, OSHA and NFPA have been working together to develop strategies for communication, outreach, and training. During development of the current edition of NFPA 704, the Committee on Classification and Properties of Hazardous Chemical Data considered the implications of the pending HCS regulation and the inclusion of the GHS requirements. Without a clear picture of what the final rule might look like, though, the committee elected not to take any action as part of that revision. When OSHA announced that the new GHS requirements had become part of its HazCom document, the committee established task groups to consider what impact the new HazCom could have on NFPA 704. The hazard category numerical values and the health hazard criteria thresholds were identified as the issues most likely to require immediate attention and guidance.

Working with members of the NFPA committee, NFPA staff developed a standard response, available through its advisory service, that addresses questions on the status of NFPA 704 and the impact of HCS and GHS. At the same time, OSHA, NFPA, and members of the technical committee have collaborated on a communication tool to guide users of 704, HCS, and GHS during this implementation period. An outreach task group has prepared a reference card that shows HazCom 2012 with the GHS elements side-by-side with those of NFPA 704. The reference card will be distributed to users by NFPA and OSHA on their respective websites.

One result of this collaboration is that OSHA does not see any reason for NFPA 704 to be revised in order to correspond with the GHS category numbering. NFPA 704 ratings are still permitted for inclusion in the safety data sheet, and employers may continue to use NFPA 704 as part of a hazard communication program, provided that the aspects required by HCS that are not covered by NFPA 704 are addressed separately. Because the committee includes OSHA staff representation, future revisions of NFPA 704 could benefit from the continued collaboration established during this initial HCS implementation period.

Compliance with HazCom 2012 will be phased in over the next few years, with full compliance scheduled for 2016. An early compliance date is set for worker training, which must be met by December 2013. The OSHA and NFPA collaboration considered this initial compliance date in its response to create information resources and training tools, such as the reference card.

Once in place, NFPA plans to monitor the effectiveness of this approach through feedback obtained from emergency responders, through advisory service inquiries on NFPA 704, and through public input submitted during the next NFPA 704 revision cycle. As part of that cycle, the technical committee will further evaluate the health hazard criteria and rating level thresholds compared to those in the GHS. Since industry will have at least a bit of experience with the GHS provisions by then, it is anticipated that the technical committee will be able to revisit the NFPA 704 health hazard criteria to validate the basis for continued use or to make any necessary changes.

For now, NFPA and OSHA are working to ensure that the two systems can effectively work together without significant change. Going forward, experience from full implementation of the GHS system may demonstrate a need for slight changes to NFPA’s system, but without the expectation that it would ever be eliminated.

Guy R. Colonna, P.E., is division manager, Industrial & Chemical Engineering at NFPA.

SIDEBAR
TWO APPROACHES, ONE HAZARD

The compound epichlorohydrin is used in a variety of industries for the production of glycerol, plastics, epoxy glues and resins, and elastomers. It is highly reactive and is a significant health hazard.



The NFPA 704 hazard rating label for epichlorohydrin, at left, includes a "4" for the blue health hazard, the highest rating, meaning the hazard can be lethal. The red flammability hazard is a "3," meaning it can be ignited under almost all ambient temperatures. The yellow instability hazard is rated as a "2," meaning violent chemical change is possible at high temperatures or pressures. The white special hazard space is empty because the compound poses no special hazard.

EPICHLOROHYDRIN ¹

UN No. 2023

DANGER ²

⁴ Flammable liquid and vapor. Toxic if swallowed.
 Toxic in contact with skin. Causes severe skin burns and eye damage. May cause an allergic skin reaction. May cause cancer.

⁵ Do not breathe dust/fume/gas/mist/vapors/spray.
 Wear protective gloves/protective clothing/eye protection

Fill Weight: 18.52 lbs. Lot Number: A0323111323
 Gross Weight: 20 lbs. Fill Date: 1/15/2012
 Expiration Date: 1/13/2018

⁶ **HYPOTHETICAL CHEMICAL CORP. • Quincy, Massachusetts, USA**

The U.N.-GHS hazard labeling standard adopted by OSHA takes a different approach. Each label requires, 1) a product identifier and codes, in this case the name of the compound and its code number; 2) a signal word, either danger or warning; 3) pictograms depicting associated hazards, in this case, clockwise from top, flammable, toxic if swallowed, skin burns and eye damage, may cause cancer; 4) a written list of associated hazards; 5) precautionary statements related to the hazard; and 6) supplier information. The pictograms do not include numbered hazard ratings, but supporting information in the safety data sheets does include numerical ratings, which are organized with "1" being the most serious level of hazard — the opposite of the hazard rating scale used in NFPA 704 and a source of potential confusion for users.