

TerranearPMC Safety Share

Week of July 30, 2012 – Haz Com Hazards

One of the new requirements of the Hazard Communication Standard (based on the United Nations Globally Harmonized System for the Classification and Labeling of Hazardous Chemicals) is that employees need to be trained in, not just the traditional health and physical hazards of chemicals, but also to ensure employees receive applicable training for materials which pose the unique hazards within the categories of simple asphyxiates, combustible dusts, pyrophoric gases, and *hazards not otherwise classified*.

In the past when one spoke of chemical hazards, the four categories that were typically mentioned were: flammability, toxicity, corrosivity and reactivity. With the new ruling, hazards have been re-categorized using a *building block* approach. This approach uses various layers to categorize or classify a hazardous chemical. As a result, hazard classes are less broad in scope and therefore tend to be more specific. This is followed by further defining the hazard to capture a more detailed characterization of the chemical's properties, which is then, further categorized in terms of severity. Thus a concentrated formula of phosphoric acid and a "food grade" concentration may fall within the same classification and sub-classification, but have different categories (referred to as "end points") due to their difference in severity. Easy? Probably not. The fact is, to truly understand how hazardous chemicals are classified under the new Hazard Communication standard will take some time, effort and training. As a beginning step, let's look at health hazards, of which there are nine separate sub-classes. There are:

1) Acute Toxicity – 2) Skin Corrosion/Irritation – 3) Serious Eye Damage/Eye Irritation – 4) Respiratory or Skin Sensitization – 5) Germ Cell Mutagenicity – 6) Carcinogenicity – 7) Reproductive Toxicology – 8) Target Organ Systemic Toxicity (this includes two sub-sub categories: *single exposure* and *repeated exposure*) – 9) Aspiration Toxicity.

For Physical Hazards, there are sixteen sub-classes:

1) Explosives – 2) Flammable Gases – 3) Flammable Aerosols – 4) Oxidizing Gases – 5) Gases Under Pressure – 6) Flammable Liquids – 7) Flammable Solids – 8) Self Reactive Substances – 9) Pyrophoric Liquids – 10) Pyrophoric Solids – 11) Self Heating Substances – 12) Substances which, in Contact with Water Emit Flammable Gases – 13) Oxidizing Liquids – 14) Oxidizing Solids – 15) Organic Peroxides – 16) Corrosive to Metals.

Each one of these health and physical hazard sub-classes can be further broken down into categories based on their specific severity and can be determined through following the processes described in Appendices A & B of OSHA's new Hazard Communication Standard (still listed under 29 CFR 1910.1200).

Under paragraph *h* of OSHA's Haz Com Standard, "Employee Information and Training," it is required that aside from the health and physical hazards, employees need to be trained in the chemicals associated with simple asphyxiation, pyrophoric gases, combustible dusts, and *hazards not otherwise classified*.

While the list of physical hazards does incorporate pyrophoric liquids and pyrophoric solids, it has been mandated that hazards associated with pyrophoric gases be presented as a separate concern. A pyrophoric gas (pyrophoric comes from the Greek meaning fire-bearing) is a gas that will spontaneously ignite (without an ignition source) at 130 °F. Obviously this is a very hazardous substance and if handled or stored inappropriately, the consequences could be severe. Examples are arsine, diborane, diphosphane and silane; substances used in the semi-conductor industry as well as other manufacturing processes.

The hazards associated with combustible dust have been known for years. Yet, while there are a number of guidelines from the National Fire Protection Association (NFPA), there is no OSHA regulation, outside of the general duty clause, that provides for the safety of employees that work within environments where combustible dusts are generated. When dust particulate gets suspended in air and reaches a certain concentration, the atmosphere becomes explosive. Actually the proper term is *deflagration* which is a specific type of explosion and is defined as the combustion or reaction which propagates a pressure wave at a velocity that is less than the speed of sound (as opposed to a detonation which propagates faster than sound – BOOM!). This rapid increase in pressure, while not as rapid as the speed of sound, can cause catastrophic damage. A combustible dust explosion hazard may exist in a variety of industries, including: food (e.g., candy, starch, flour, feed), plastics, wood, rubber, furniture, textiles, pesticides, pharmaceuticals, dyes, coal, metals (e.g., aluminum, chromium, iron, magnesium, and zinc), and fossil fuel power generation. NFPA has determined that any industrial process that reduces a combustible material (as well as some normally noncombustible materials) into finely divided particles can present a potential for a serious fire or explosion. Depending on the material type, and particulate size (mean aerodynamic diameter) and shape, the specific concentration that can cause an explosion/deflagration will vary. Traditionally, particles with a diameter of 420 microns or less (finer) are the most susceptible for creating an explosive environment.

The term, Hazard Not Otherwise Classified (HNOC), is defined as a substance (chemical) with an adverse physical or health effect identified through evaluation of scientific evidence (during the classification process), yet not meeting the specified criteria for the physical and health classes addressed through the agreed-upon building block approach. So while a specific chemical has been known to cause an adverse health effect (even death), if the quantity needed to cause an adverse effect is such that it is below the cut-off value/concentration of the hazard class (as presented in either Appendix A and/or B of the Hazard Communication standard), then it would be classified as HNOC.

While the criteria for classifying hazardous chemicals are detailed in the new Hazard Communication Standard (appendices), the new standard has given this responsibility to the chemical manufacturers, importers and distributors. The actual end-user or employer does not have this responsibility, unless it is decided that they wish to do so. Regardless of what organization performs the classification, the reasoning and methodology of how a specific chemical has been classified needs to be documented and available upon request.

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Walt Disney