

Hazard Classification

U.S. Department of Labor (DOL) – Occupational Safety and Health Administration (OSHA)

When one thinks of hazard classification, those of us in emergency response think of the U.S. Department of Transportation (DOT). After all we use DOT's "Emergency Response Guidebook" upon arrival to identify the chemical that necessitated our presence. But hazard classification begins with the U.S. Department of Labor's (DOL) "Occupational Safety and Health Administration" (OSHA)

Hazard Classification is a process required under paragraph (d) of 29 Code of Federal Regulations (CFR) 1910.1200 (OSHA's Hazardous Communication Standard). Paragraph (d) states: "...For each chemical, the chemical manufacturer or importer shall determine the hazard classes, and where appropriate, the category of each class that apply to the chemical being classified...Chemical manufacturers, importers and employers classifying chemicals shall identify and consider the full range of available scientific literature and other evidence concerning the potential hazards. There is no requirement to test the chemical to determine how to classify its hazards. Appendix A to 1910.1200 shall be consulted for classification of health hazards, and Appendix B to 1910.1200 shall be consulted for the classification of physical hazards".¹ Even though we receive OSHA's Hazard Communication training as emergency responders, we are more familiar with the physical hazard classifications, and since we use a DOT book we forget about OSHA's role in the process and don't consider the correlation.

Classification lists the specific Classes of hazards, s\for example "acute toxicity" or "flammable liquids". Within the Hazard Classes the degree of hazard is indicated with a category. The Category is usually a number (1-4) or letter (A, B, C), with 1 and A equaling the highest hazard and 4 equaling the least hazardous; although there are a few that are indicated with words. 1 indicates a greater hazard category than 2, and A is a greater hazard than B. Some of the numeric categories have subcategories, so Class 2A is more hazardous than Class 2B, for example. For gases and some reproductive toxins, the categories are listed by names rather than numbers and letters. **THIS IS NOT THE SAME AS THE NFPA 704 SYSTEM!**

In the classifications for physical hazards, not all hazard classes have entries 1-4; some have only category 1, some have 1-2, 1-3 or 1-4, and Explosives is broken into 6 divisions.

In a hazard classification, only the intrinsic (inherent) hazardous properties of chemicals are considered. The three steps involved are:

1. Identification of relevant data regarding the hazards of a chemical;
2. Subsequent review of those data to ascertain the hazards associated with the chemical;
3. Determination of whether the chemical will be classified as hazardous and the degree of hazard.

In a manufacturing or import setting, the following specific Health hazard criteria is reviewed:

- Acute Toxicity (Oral, Dermal and Inhalation), Categories 1-4
- Skin Corrosion / Irritation, Categories 1A, 1B, 1C, and 2
- Serious Eye damage / Eye Irritation, Categories 1, 2A, and 2B
- Respiratory or Skin Sensitization, Category 1A and 1B

¹ U.S. DOL-OSHA "Hazard Communication Standard" paragraph (d) 29CFR 1910.1200

- Germ Cell Mutagenicity, Categories 1A, 1B, and 2
- Carcinogenicity, Categories 1A, 1B, and 2
- Reproductive Toxicity, Categories 1A, 1B, 2; lactation
- Specific Target Organ Toxicity; single exposure, Categories 1-3
- Specific Target Organ Toxicity: repeated or prolonged exposure, Categories 1 and 2
- Aspiration Hazard, Category 1

In a manufacturing or import setting, the following specific Physical hazard criteria is reviewed:

- Explosives, Divisions 1.1-1.6
- Flammable Gases, Categories 1 and 2
- Flammable Aerosols, Categories 1 and 2
- Oxidizing Gases, category 1
- Gases under Pressure, Groups: Compressed, Liquefied, Dissolved, Refrigerated Liquid
- Flammable Liquids, Categories 1-4
- Flammable Solids, Categories 1 and 2
- Self-Reactive Chemicals, Types A-G
- Pyrophoric Liquids, Category 1
- Pyrophoric Solids, Category 1
- Self-Heating Chemicals, Categories 1 and 2
- Chemicals which, in Contact with Water, emit Flammable Gases, Categories 1-3
- Oxidizing Liquids, Categories 1-3
- Oxidizing Solids, Categories 1-3
- Organic Peroxides, Types A-G
- Corrosive to Metals, Category 1

U.S. Department of Transportation (DOT)

The mission of the U.S. Department of Transportation (DOT) is to serve the United States by ensuring a fast, safe, efficient, accessible and convenient transportation system that meets our vital national interests and enhances the quality of life of the American people, today, and into the future.²

Following and understanding OSHA classification standards, it is easy to see that many of DOT's regulations parallel or further define OSHA regulations regarding health and safety in the workplace. When first responders respond to a transportation incident it is an extension of the manufacturing workplace; just as it is an extension of the fire station worksite. A terrific summary of these is available from DOT on their web page titled "How to Comply with Federal Hazardous Materials Regulations". This document is a must-read for anyone who is shipping or transporting hazardous materials. First

² www.dot.gov

responders should read this document also because the hazardous materials regulations are applicable to the transportation of hazardous materials in commerce and their offering to:

- Interstate, intrastate, and foreign carriers by rail car, aircraft, motor vehicle and vessel.
- The representation that a hazardous material is present in a package, container, rail car, aircraft, motor vehicle or vessel.
- The manufacture, fabrication, marking, maintenance, reconditioning, repairing or testing of a package or container which is represented, marked, certified or sold for use in the transportation of hazardous materials (49 CFR 171.1(a)).

DOT's Hazardous Materials Regulations apply to the following (see: 49 CFR 171.1 (a)):

1. The offering of hazardous materials for transportation and transportation of hazardous materials in interstate, intrastate, and foreign commerce by rail car, aircraft, motor vehicle, and vessel.
2. The representation that a hazardous material is present in a package, container, rail car, aircraft, motor vehicle, or vessel.
3. The use of terms and symbols prescribed in 49 CFR 171.1 (a) for the marking, labeling, placarding, and description of hazardous materials and packages used in their transport.

DOT's Hazard Classification System

The hazard class of dangerous goods is indicated either by its class (or division) number or name. Placards are used to identify the class or division of a material. The hazard class or division number must be displayed in the lower corner of a placard and is required for both primary and subsidiary hazard classes and divisions, if applicable. For other than Class 7 placards, text indicating a hazard (for example, "CORROSIVE") is not required. Text is shown only in the U.S. The hazard class or division number and subsidiary hazard classes or division numbers placed in parentheses (when applicable), must appear on the shipping document after each proper shipping name.

The following is from Page 6, of the U.S. DOT – Pipeline and Hazardous Materials Safety Administration's (PHMSA) "Emergency Response Guidebook". It is this book that every first responders in the U.S. is trained on to assist in identifying a hazardous material during the first 15 minutes of an incident.

Class 1 – Explosives

- Division 1.1 Explosives which have a mass explosion hazard
- Division 1.2 Explosives which have a projection hazard but not a mass explosion hazard
- Division 1.3 Explosives which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard
- Division 1.4 Explosives which present no significant blast hazard
- Division 1.5 Very insensitive explosives with a mass explosion hazard
- Division 1.6 Extremely insensitive articles which do not have a mass explosion hazard

Class 2 – Gases

- Division 2.1 Flammable gases
- Division 2.2 Non-flammable, non-toxic* gases
- Division 2.3 Toxic* gases

Class 3 – Flammable liquids (and Combustible liquids [U.S.]

**Class 4 – Flammable solids; Substances liable to spontaneous combustion;
Substances which, on contact with water, emit flammable gases**

- Division 4.1 Flammable solids, self-reactive substances and solid desensitized explosives
- Division 4.2 Substances liable to spontaneous combustion
- Division 4.3 Substances which in contact with water emit flammable gases

Class 5 – Oxidizing substances and Organic peroxides

- Division 5.1 Oxidizing substances
- Division 5.2 Organic peroxides

Class 6 – Toxic* substances and Infectious substances

- Division 6.1 Toxic* substances
- Division 6.2 Infectious substances

Class 7 – Radioactive materials

Class 8 – Corrosive substances

Class 9 – Miscellaneous dangerous goods/hazardous materials and articles

*The words “poison” or “poisonous” are synonymous with the word “toxic”.³

³ Page 6 U.S. DOT-PHMSA “Emergency Response Guidebook”