



## **DEFINITIONS OF HAZARDOUS MATERIAL (2016 California Fire Code)**

**AEROSOL.** A product that is dispensed from an aerosol container by a propellant. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level 1, 2 or 3.

- Level 1 aerosol products. Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g).
- Level 2 aerosol products. Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20 kJ/g), but less than or equal to 13,000 Btu/lb (30 kJ/g).
- Level 3 aerosol products. Those with a total chemical heat combustion that is greater than 13,000 Btu/lb (30 kJ/g).

**CORROSIVE.** A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR, Part 173.137, such a chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.

**COMBUSTIBLE LIQUID.** A liquid having a closed cup flash point at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:

- Class II. Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).
- Class IIIA. Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).
- Class IIIB. Liquids having a closed cup flash point at or above 200°F (93°C).

The category of combustible liquids does not include compressed gases or cryogenic fluids.

**FLAMMABLE LIQUID.** A liquid having a closed cup flash point below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:

- Class IA. Liquids having a flash point below 73°F (23°C) and a boiling point below 100°F (38°C).
- Class IB. Liquids having a flash point below 73°F (23°C) and a boiling point at or above 100°F (38°C).
- Class IC. Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C).

The category of flammable liquids does not include compressed gases or cryogenic fluids.

**HIGHLY TOXIC.** A material which produces a lethal dose or lethal concentration that falls within any of the following categories:

1. A chemical that has a median lethal dose (LD50) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
2. A chemical that has a median lethal dose (LD50) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.
3. A chemical that has a median lethal concentration (LC50) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Mixtures of these materials with ordinary materials, such as water, might not warrant classification as highly toxic. While this system is basically simple in application, any hazard evaluation that is required for the precise categorization of this type of material shall be performed by experienced, technically competent persons.

**OXIDIZER.** A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials. Examples of other oxidizing gases include bromine, chlorine and fluorine.

- Class 4. An oxidizer that can undergo an explosive reaction due to contamination or exposure to thermal or physical shock. Additionally, the oxidizer will enhance the burning rate and can cause spontaneous ignition of combustibles.
- Class 3. An oxidizer that will cause a severe increase in the burning rate of combustible materials with which it comes in contact or that will undergo vigorous self-sustained decomposition due to contamination or exposure to heat.
- Class 2. An oxidizer that will cause a moderate increase in the burning rate or that causes spontaneous ignition of combustible materials with which it comes in contact.
- Class 1. An oxidizer whose primary hazard is that it slightly increases the burning rate but which does not cause spontaneous ignition when it comes in contact with combustible materials.

## **EXAMPLES OF HAZARDOUS MATERIAL**

### **E102.1.2 Compressed gases.**

#### **Examples include:**

1. Flammable: acetylene, carbon monoxide, ethane, ethylene, hydrogen, methane. Ammonia will ignite and burn although its flammable range is too narrow for it to fit the definition of flammable gas.
2. Oxidizing: oxygen, ozone, oxides of nitrogen, chlorine and fluorine. Chlorine and fluorine do not contain oxygen but reaction with flammables is similar to that of oxygen.

3. Corrosive: ammonia, hydrogen chloride, fluorine.
4. Highly toxic: arsine, cyanogen, fluorine, germane, hydrogen cyanide, nitric oxide, phosphine, hydrogen selenide, stibine.
5. Toxic: chlorine, hydrogen fluoride, hydrogen sulfide, phosgene, silicon tetrafluoride.
6. Inert (chemically unreactive): argon, helium, krypton, neon, nitrogen, xenon.
7. Pyrophoric: diborane, dichloroborane, phosphine, silane.
8. Unstable (reactive): butadiene (unstabilized), ethylene oxide, vinyl chloride.

### **E102.1.3 Flammable and combustible liquids.**

#### **Examples include:**

1. **Flammable liquids.**
  - Class IA liquids shall include those having flash points below 73°F (23°C) and having a boiling point at or below 100°F (38°C).
  - Class IB liquids shall include those having flash points below 73°F (23°C) and having a boiling point at or above 100°F (38°C).
  - Class IC liquids shall include those having flash points at or above 73°F (23°C) and below 100°F (38°C).
2. **Combustible liquids.**
  - Class II liquids shall include those having flash points at or above 100°F (38°C) and below 140°F (60°C).
  - Class IIIA liquids shall include those having flash points at or above 140°F (60°C) and below 200°F (93°C).
  - Class IIIB liquids shall include those liquids having flash points at or above 200°F (93°C).

### **E102.1.7 Oxidizers.**

#### **Examples include:**

1. Gases: oxygen, ozone, oxides of nitrogen, fluorine and chlorine (reaction with flammables is similar to that of oxygen).
2. Liquids: bromine, hydrogen peroxide, nitric acid, perchloric acid, sulfuric acid.
3. Solids: chlorates, chromates, chromic acid, iodine, nitrates, nitrites, perchlorates, peroxides.

### **E102.2.1 Highly toxic materials.**

#### **Examples include:**

1. Gases: arsine, cyanogen, diborane, fluorine, germane, hydrogen cyanide, nitric oxide, nitrogen dioxide, ozone, phosphine, hydrogen selenide, stibine.
2. Liquids: acrolein, acrylic acid, 2-chloroethanol (ethylene chlorohydrin), hydrazine, hydrocyanic acid, 2-methylaziridine (propylenimine), 2-methylacetone nitrile (acetone cyanohydrin), methyl ester isocyanic acid (methyl isocyanate), nicotine, tetranitromethane and tetraethylstannane (tetraethyltin).
3. Solids: (aceto) phenylmercury (phenyl mercuric acetate), 4-aminopyridine, arsenic pentoxide, arsenic trioxide, calcium cyanide, 2-chloroacetophenone, aflatoxin B, decaborane(14), mercury (II) bromide (mercuric bromide),

mercury (II) chloride (corrosive mercury chloride), pentachlorophenol, methyl parathion, phosphorus (white) and sodium azide.

### **E102.2.3 Corrosives.**

#### **Examples include:**

1. Acids: Examples: chromic, formic, hydrochloric (muriatic) greater than 15 percent, hydrofluoric, nitric (greater than 6 percent, perchloric, sulfuric (4 percent or more).
2. Bases (alkalis): hydroxides-ammonium (greater than 10 percent), calcium, potassium (greater than 1 percent), sodium (greater than 1 percent); certain carbonates-potassium.
3. Other corrosives: bromine, chlorine, fluorine, iodine, ammonia.

**Note:** Corrosives that are oxidizers, e.g., nitric acid, chlorine, fluorine; or are compressed gases, e.g., ammonia, chlorine, fluorine; or are water-reactive, e.g., concentrated sulfuric acid, sodium hydroxide, are physical hazards in addition to being health hazards.