

# HAZARDOUS MATERIAL REFERENCE CHART

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Users must make independent determinations of suitability and completeness of information.

## CLASS 1 EXPLOSIVES

An explosive is any chemical which can "explode" (undergo an extremely rapid release of gases and heat) and cause significant damage, when subjected to a sufficient initiating force, such as a fire, being dropped, or with a blasting cap. Explosives are assigned to CLASS 1 and divided into six divisions.

**DIVISION 1.1** consists of explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.  
*example:* Barium azide, dry or wetted with less than 50% water by mass.



**DIVISION 1.2** consists of explosives that have a projection hazard but not a mass explosion hazard.  
*example:* Specific types of ammunition.



**DIVISION 1.3** consists of explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.  
*example:* Incendiary devices.



**DIVISION 1.4** consists of explosives that present a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.  
*example:* Proof ammunition; practice grenades.



**DIVISION 1.5** consists of very insensitive explosives. This division is comprised of substances which have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.  
*example:* Ammonium nitrate-fuel oil mixture containing only prilled Ammonium nitrate and fuel oil.



**DIVISION 1.6** consists of extremely insensitive articles which do not have a mass explosive hazard. This division is comprised of articles which contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.  
*example:* Extremely insensitive explosives.



## CLASS 2 GASES

A gas is a physical form of matter which conforms to the shape of its container, and exerts a pressure on the container. Gases can be classified as "flammable", "non-flammable" or "poison".

**DIVISION 2.1 (Flammable Gas)** is a gas which will readily ignite at a concentration of 13 percent of less in air and has a flammable range of at least 12 percent, regardless of the lower flammability limit.

*example:* Flammable gases: Hydrogen, Propane, Silane.



**DIVISION 2.2 (Non-Flammable Gas)** is a gas which can ignite under some conditions, is not classed as a flammable gas, because it does not meet the DOT requirements for being classified as a flammable gas.

*example:* Non-Flammable gases: Nitrogen, Carbon dioxide, Hydrogen chloride.



**DIVISION 2.3 (Poisonous Gas)** is a gas which is known to be so toxic to humans as to pose a hazard to health during transportation or for which actual testing has shown that the lethal concentration which kills 50% of the test animals (LC50) is less than or equal to 5000 ml/m3 (0.5% by volume in air).

*example:* Poisonous gases: Hydrogen sulfide, Hydrogen cyanide, Arsine.



## CLASS 3 FLAMMABLE LIQUIDS

CLASS 3 flammable liquid is a liquid chemical which will readily ignite, if subjected to a flame, or other ignition source. A flammable liquid (Class 3) means a liquid having a flash point of not more than 60.5°C (141°F), or any material in a liquid phase with a flash point at or above 37.8°C (100°F) that is intentionally heated and offered for transportation or transported at or above its flash point in a bulk packaging, with some exceptions.

*example:* Gasoline, Hexane, Toluene.

[Combustible liquids are a subset of flammable liquids, and ignite, but not as easily as flammable liquids. The flash point of a combustible liquid is between 38°C (100°F) and 93°C (200°F). Diesel fuel is usually a combustible liquid.]



## CLASS 4 FLAMMABLE SOLIDS

Flammable solids are solids which readily ignite under appropriate conditions, which may include exposure to air or water, friction, or an ignition source.

**DIVISION 4.1 (Flammable Solid)** includes certain explosives which have been wetted with water or alcohol and are not sensitive to explosion, but can ignite and burn; and chemicals which are specifically assigned to Division 4.1 by the DOT.

*example:* Films, nitrocellulose base gelatine coated (except scrap), Naphthalene molten.



**DIVISION 4.2 (Spontaneously Combustible Material)** means a pyrophoric material or a self-heating material. Lithium alkyls are an example of a pyrophoric material (a chemical which spontaneously ignites when exposed to air) in Division 4.2.

*example:* Activated Carbon, Pentaborane.



**DIVISION 4.3 (Dangerous when wet material)** means a material that, by contact with water, is liable to become spontaneously flammable or to give off flammable or toxic gas at a rate greater than 1 liter per kilogram of the material, per hour.

*example:* Sodium, Potassium, and Lithium hydride.



## CLASS 5 OXIDIZER

**DIVISION 5.1 (Oxidizer)** means a material that may, generally by providing oxygen, cause or enhance combustion of other materials.

*example:* Sodium chlorate, Potassium permanganate, Zinc nitrate, Urea hydrogen peroxide.



**DIVISION 5.2 (Organic Peroxide)** is a chemical related to hydrogen peroxide, which also contains carbon atoms. An example is benzoyl peroxide, which is the active ingredient in various acne medications, but, in pure form, is a strong oxidizing material.

*example:* Benzoyl peroxide, t-Butylperoxy ethylhexanoate, Diisopropyl peroxydicarbonate.



## CLASS 6 POISONOUS MATERIAL

CLASS 6 (Poisons) are solids or liquids, which, if they enter the body at a relatively low dose, can cause illness or death.

**DIVISION 6.1** includes poisonous solids and liquids. Based on animal testing, a liquid with a lethal dose which kills 50% of the test animals (LD 50) for acute oral toxicity of not more than 500 mg/kg or a solid with an LD 50 for acute oral toxicity of not more than 200 mg/kg must be classified as Division 6.1. If the chemical is very toxic as a result of skin contact, then the Dermal Toxicity criteria is used, which is an LD 50 for acute dermal toxicity of not more than 1000 mg/kg.

*example:* Potassium cyanide, Methyl iodide.



**DIVISION 6.2** includes substances which are infectious to humans or animals.  
*example:* Some microorganisms, contaminated bodily fluids, and medical samples.



## CLASS 7 RADIOACTIVE MATERIALS

CLASS 7 (Radioactive Materials) are solids, liquids, or gases which contain atoms that spontaneously change into other atoms, with the loss of energy, that is, the atom disintegrates with the release of radiation, and the radiation can be measured. Uranium, for example, can spontaneously disintegrate to form thorium, while releasing a form of energy usually called an alpha-particle.

*example:* Uranium, Plutonium, and Tritium are some examples of radioactive elements.



## CLASS 8 CORROSIVE MATERIALS

CLASS 8 (Corrosive Materials) include a variety of acids, caustics, and related liquids, solids, and gases, which easily burn tissue or dissolve metal, if allowed to come into contact with the tissue or metal.

*example:* Hydrochloric acid, Sodium hydroxide, Ammonium hydrogen sulfate.



## CLASS 9 MISCELLANEOUS HAZARDOUS MATERIALS

CLASS 9 Some chemicals do not fall into any of the other eight hazard classes, but still pose some hazards during transportation. These are classified as "Miscellaneous Hazardous Materials". Some hazardous wastes and some anesthetic agents, when transported by air, fall into this class. Some consumer products will fall into a special subset of this class, called "Other Regulated Material".

*example:* Asbestos, Dry ice



The above explanations, while consistent with the Department of Transportation (DOT) Hazard Classes, do not replace the DOT definitions. Refer to 49 CFR, Subpart 173, if DOT definitions are needed.