

materials. No person or business wants the negative repercussions resulting from a hazardous materials aviation incident. Take the time to evaluate whether or not your shipment is hazardous and learn how to ship it safely. Federal Hazardous Materials experts believe that the most frequent explanation for undeclared shipments is a shipper's lack of knowledge--an unawareness or misunderstanding of the requirements for properly declaring and transporting Hazardous Materials.

If a shipment isn't properly classed, described, packaged, marked, labeled, and in condition for shipment as required or authorized; DOT may issue civil penalties up to \$77,114 or \$463 for training violations. Frequent or knowingly violating the regulations may result in criminal prosecution. Criminal violations may result in fines, imprisonment, or both.

Examples Include (Click to Learn More):

1. Explosives

2. Gases

3. Flammable Liquids

4. Flammable Solids

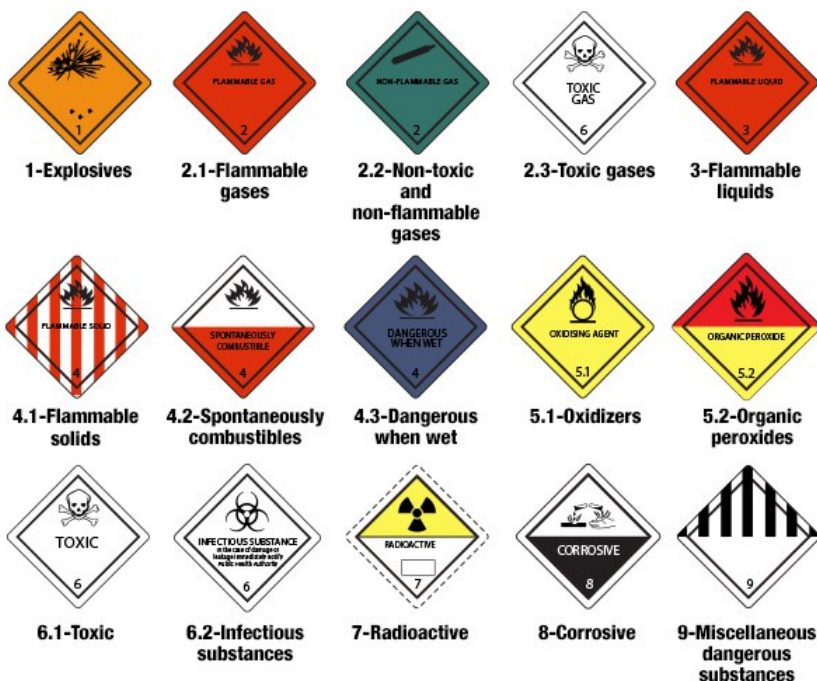
5. Oxidizing Substances

6. Toxic & Infectious Substances

7. Radioactive Material

8. Corrosives

9. Miscellaneous Dangerous Goods



***This document is for general guidance only and does not create any legally-enforceable rights or obligations.*

Class 1, Explosives:



An explosive is any substance or article, including a device or pyrotechnic substance, which is designed to function by explosion (i.e., an extremely rapid release of gas and heat) or which, by chemical reaction within itself, is able to rapidly conflagrate or detonate.

Division 1.1: Substances and articles which have a mass explosion hazard.

Division 1.2: Substances and articles which have a projection hazard but not a mass explosion hazard.

Division 1.3: Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both.

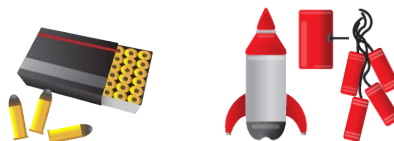
Division 1.4: Substances and articles which present no significant hazard; only a small hazard in the event of ignition or initiation during transport with any effects largely confined to the package.

Division 1.5: Very insensitive substances which have a mass explosion hazard.

Division 1.6: Extremely insensitive articles which do not have a mass explosion hazard.

Examples of common explosives:

- Fireworks
- Gun Powder
- Ammunition
- Air Bag Inflators/modules
- Seat Belt Pretensioners
- Safety Flares
- Caps for toy guns



Class 2, Gases:



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Division 2.1 - Flammable Gases



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

Examples:

- Butane fuel
- Gas soldering irons and torches
- Camp stoves / camp gas
- Hydrogen
- Lighters
- Propane tanks
- Aerosols such as spray paint, household cleaners, and bathroom sprays
- Spray cosmetics such as hair care products, deodorants, & perfumes



Division 2.2 - Nonflammable, Non-Toxic Gases



A non-flammable gas is non-flammable, nonpoisonous compressed gas - including liquefied gas, pressurized cryogenic gas, compressed gas in solution, asphyxiant gas and oxidizing gas. In transportation, a non-flammable, nonpoisonous compressed gas is any material (or mixture) which exerts a gauge pressure of 200 kPa (29.0 psig/43.8 psia) or greater at 20 °C (68 °F) in its packaging.

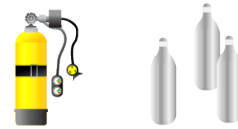
Examples:

- Nitrogen
- Carbon dioxide
- Scuba tanks
- Fire Extinguishers



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- Self-inflating rafts
- Non-flammable aerosols
- Non-flammable beauty, medicinal, and hygiene products
- Mace, tear gas, & pepper spray



Division 2.3 - Poison (Toxic) Gases



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).

Examples:

- Hydrogen sulfide
- Hydrogen cyanide
- Arsine

Class 3, Flammable Liquids:



Flammable and combustible liquids are present in almost every workplace. Fuels and many common products like solvents, thinners, cleaners, adhesives, paints, waxes and polishes may be flammable or combustible liquids.

Any liquid having a flash point of not more than 60 °C (140 °F), or any material in a liquid phase with a flash point at or above 37.8 °C (100 °F) that is offered for transportation is classified as a flammable liquid.

Examples:

- Gasoline
- Some alcohols



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- Camp fuels, kerosene, fire starting fluids, etc.
- Paint
- Perfumery products
- Resins
- Varnishes
- Methylated Spirits
- Some essential oils
- Lighter refills
- Ethanol, Methanol, Isopropanol
- Nail Polish
- Acetone
- Oil-based paints
- Paint thinner



Class 4, Flammable Solids; Substances Liable to Spontaneous Combustion; & Substances which, on Contact with Water, Emit Flammable Gases:



Flammable solids are any materials in the solid phase of matter that can readily undergo combustion in the presence of a source of ignition under normal circumstances. The definition includes self-reactive materials, which are materials that are thermally unstable and can experience a strong, exothermic decomposition without oxygen; and readily combustible solids, which may cause a fire through friction, e.g., matches.

Division 4.1 - Flammable Solids



Flammable Solids consist of self-reactive materials, which are materials that are thermally unstable and that can undergo a strongly exothermic decomposition even without participation of oxygen; desensitized explosives such as those wetted with sufficient water, alcohol, or plasticizer to suppress explosive properties; and readily combustible solids, which are solids which may cause a fire through friction, such as matches.

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Examples:

- Matches
- Sulfur
- Black powder



Division 4.2 - Spontaneously Combustible



Spontaneously combustible materials can be either a pyrophoric material, which is a liquid or solid that can ignite within five (5) minutes after coming in contact with air; or can self-heat when in contact with air and without an energy supply.

Examples:

- Activated carbon
- Rags and waste with oil and paint residues
- Towels and linen, during laundering and drying
- Paint overspray or material from a paint spray booth
- Coal
- Carbon
- Fish oils / Fish meal
- Haystacks
- Green waste piles and compost
- Cellulose nitrate

Division 4.3 - Dangerous When Wet



Dangerous when wet material is water reactive, meaning that it's spontaneously flammable or likely to give off flammable or toxic gas when coming in contact with water.

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Examples:

- Aluminum powder
- Magnesium
- Lithium
- Lithium hydride
- Potassium
- Sodium

Class 5, Oxidizing Substances & Organic Peroxides:



Oxidizing materials are liquids or solids that readily give off oxygen or other oxidizing substances (such as bromine, chlorine, or fluorine). They also include materials that react chemically to oxidize combustible (burnable) materials; this means that oxygen combines chemically with the other material in a way that increases the chance of a fire or explosion. This reaction may be spontaneous at either room temperature or may occur under slight heating. Oxidizing liquids and solids can be severe fire and explosion hazards.

Division 5.1 – Oxidizing Substance



Materials that may, generally by yielding oxygen, cause or enhance the combustion of other materials.

Examples:

- Hydrogen peroxide
- Oxygen generators /cylinders
- Chromic acid Dibenzoyl peroxide
- Fluorine
- Calcium chlorate Calcium hypochlorite
- Chlorine trifluoride, i.e., pool chlorine and chlorine tablets
- Bleach
- Nitrites



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- Nitrates
- Nitric Acid
- Perchloric acid

Division 5.2 - Organic Peroxides



Organic compounds containing oxygen (O) in the bivalent -O-O- structure and which may be considered a derivative of hydrogen peroxide, where one or more of the hydrogen atoms have been replaced by organic radicals. The plastics and rubber industries are the heaviest users of organic peroxides.

Examples:

- Accelerators
- Activators
- Catalysts
- Curing agents
- Hardeners
- Methyl ethyl ketone peroxide
- Resins
- Acetone peroxide
- Polyester resin kits

Class 6, Poisons (Toxics) & Infectious Substances:



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Division 6.1 - Poisons (Toxics)



A poisonous material is a material, other than a gas, which is known to be so toxic to humans as to afford a hazard to health during transportation, or which, in the absence of adequate data on human toxicity.

Is presumed to be toxic to humans because it falls within any one of the following categories when tested on laboratory animals (whenever possible, animal test data that has been reported in the chemical literature should be used):

1. Oral Toxicity. A liquid or solid with an LD50 for acute oral toxicity of not more than 300 mg/kg.
2. Dermal Toxicity. A material with an LD50 for acute dermal toxicity of not more than 1000 mg/kg.
3. Inhalation Toxicity. (A) A dust or mist with an LC50 for acute toxicity on inhalation of not more than 4 mg/L

Examples:

- Arsenic
- Insecticides
- Pesticides
- Some medicines
- Some engine fuel additives
- Some disinfectants

Division 6.2 – Infectious Substances



An infectious substance is a material known or reasonably expected to contain a pathogen. A pathogen is a microorganism (including bacteria, viruses, rickettsiae, parasites, fungi) or other agent, such as a proteinaceous infectious particle (prion), that can cause disease in humans or animals.

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Examples:

- HIV
- Hepatitis B
- Anthrax
- Blood samples
- Used needles

Class 7, Radioactive Material



Radioactive material means an unstable material that releases radionuclides as it decays.

- A RADIOACTIVE WHITE-I label means practically no radiation outside the package.
- RADIOACTIVE YELLOW-II label means some radiation outside the package.
- The RADIOACTIVE YELLOW-III label is for higher radiation levels than RADIOACTIVE I and II.
- The FISSILE white label indicates special handling instructions.

Examples:

- Radioactive medicines
- Isotopes used in research (Carbon-14, etc.)
- X-ray machines and other equipment with radioactive sources
- Smoke alarms
- Some luminous paints



Class 8, Corrosives



A corrosive material is a highly-reactive liquid or solid substance that chemically causes damage to living tissue, i.e., full thickness destruction of human skin at the site of contact within a specified period of time. Acids and bases are common corrosive materials.

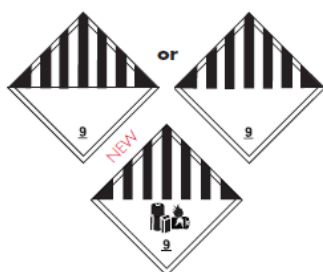
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Examples:

- Sulfuric acid and hydrochloric acid (*most acids)
- Potassium and sodium hydroxide
- Wet and NiCad batteries
- Drain cleaner
- Paint / Paint stripper
- Mercury thermometers and barometers
- Alkalis



Class 9, Miscellaneous Hazardous Materials



These items are considered hazardous by the DOT but do NOT meet the criteria of one of the first eight hazard classes. Miscellaneous dangerous goods present a multitude of potential hazards to human health and safety, property, and the environment.

Examples:

- Dry Ice
- Engines
- Lithium batteries
 - ** (Lithium batteries are the #1 risk in aviation)
- Air Bag Inflators/Modules
- Seat Belt Pretensioners
- Magnetized material
- Dangerous goods in machinery
- Battery powered equipment
- Battery powered vehicles
- Expandable polymeric beads / polystyrene beads
- Ammonium nitrate fertilizers
- Blue asbestos / crocidolite



Hazmat Questions? For questions about hazardous materials (chemicals, batteries, battery-powered devices, gases, aerosols, flammables, etc.) you may contact the FAA Office of
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Hazardous Materials Safety via e-mail at hazmatinfo@faa.gov. Please allow 1-2 business days for answers to e-mail questions.

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