INCOMPATIBLE CHEMICALS
Up-dated October 2011

Sources
Accident Prevention Manual for Industrial Operations, 6th ed., National Safety Council, Fire Protection Guide on Hazardous Materials, 6th ed., National Fire Protection Association; 49CFR173; recent laboratory inspections.

Incompatible materials should not be stored together where they can be inadvertently mixed or where a spill or leak can cause danger. General guidelines are:

1. Oxygen and fuels must not be stored together.
2. Water reactive materials are not to be stored with flammables (except where a flammable is used to blanket a material such as sodium and then at least practical quantity), or in an area where they could become wet (under a sink, sprinkler head, shower, etc.)
3. Strong acids and bases are not to be stored together.
4. Materials which can produce poisonous gases must not be stored with products which accelerate the release of the gas. (Examples: cyanogens are not to be stored with an acid, or cleaning products containing chlorine are not to be stored with ammonia.)
5. Explosives (picric acid, etc.) are not to be stored with fuels.
6. Incompatible acids must not be stored together. (Examples: perchloric acid is not to be stored with a reducing agent such as sulfuric acid, as upon mixing, this could produce a shock sensitive explosive; nitric acid and acetic acid, a potential explosive mixture, must not be stored together.)

Specific examples of incompatible items likely to be found in laboratories are:

Chemical	**Store Away From or Out of Contact With**
Acetic Acid	Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides and permanganates.
Acetic Anhydride	Boric acid, chromic acid, glycerol, hydrochloric acid, hydrofluoric acid, hydrogen peroxide, nitric acid, perchloric acid, sulfuric acid and water.
Acetone	Chloroform, hydrogen peroxide, nitric and acetic acid, nitric and sulfuric acid.
Acetylene	Chlorine, bromine, copper, fluorine, silver and mercury.
Alkaline Metals	Carbon tetrachloride or other chlorinated hydrocarbon carbon dioxide and the halogens
Ammonia, Anhydrous	Mercury (in manometers, for instance), chlorine, calcium, hypochlorite, iodine, bromine, hydrofluoric acid anhydrous.
Ammonium Hydroxide	Hydrochloric acid, hydrofluoric acid, iodine, nitric acid, propylene oxide, silver nitrate, sulfuric acid.

Ammonium Nitrate	Acids, metal powders, flammable liquids, chlorates, nitrates, sulfur, finely divided organic or combustible materials.
Aniline	Nitric acid, hydrogen peroxide.
Benzene	
Boric Acid	Acetic anhydride, potassium.
Bromine	Same as for chlorine.
Butyric Acid	
Carbon, activated	Calcium hypochlorite and all oxidizing agents.
Carbon Tetrachloride	Ethylene, potassium sodium and wax.
Chlorates	Ammonium salts, acids, metal powders, sulfur, finely divided organic or combustible materials.
Chloroform	Acetone, magnesium, potassium and sodium.
Chromic Acid	Acetic acid, naphthalene, camphor, glycerin, turpentine, alcohol and flammable liquids in general.
Chlorine	Ammonia, acetylene, butadiene, butane, methane, propane (or other petroleum gases), hydrogen sodium carbide, turpentine, benzene and finely divided metals.
Chlorine Dioxide	Ammonia, methane, phosphine and hydrogen sulfide.
Clorox (Hypochlorites)	Ammonia, cleansers that do not contain chlorine (such as Bon_ami) and cyanides.
Cueme Hydroperoxide	Acids: organic and inorganic.
Cupric Sulphate	
Ethyl Acetate	Chlorosulfonic acid and oleum.
Flammable Liquids	Ammonium nitrate, achromic acid, hydrogen peroxide, nitric acid, sodium eroxide and the halogens.
Fluorine	Isolate from everything.
Formaldehyde	
Formic Acid	Furfuryl alcohol, hydrogen peroxide, thallium trinitrate trihydrate.
Hydrochloric Acid	Acetic anhydride, ammonium hydroxide, ethylene diamine, perchloric acid, sodium hydroxide and sulfuric acid.
Hydrocarbons (butane, propane, benzene, peroxide, gasoline, turpentine etc.)	Fluorine, chlorine, bromine, chromic acid and sodium.
Hydrocyanic Acid	Nitric acid and alkalias
Hydrofluoric Acid	Acetic anhydride, ammonium hydroxide, fluorine, sodium hydroxide, sulfuric acid and vinyl actetate.

Hydrofluoric acid anhydrous	Ammonia, aqueous or anhydrous.
Hydrogen Peroxide	Copper, chromium, iron, most metals or their salts, alcohols, acetone, organic materials, aniline, nitro-methane, any flammable liquid and combustible materials.
Hydrogen Sulfide	Fuming nitric acid and oxidizing gases.
Iodine	Acetylene, ammonia (aqueous or anhydrous) and hydrogen.
Lactic Acid	Nitric acids and hydrofluoric acid.
Magnesium Chloride	2_furan percarboxylic acid.
Mercury	Acetylene, fluminic acid and ammonia.
Nitric Acid (concentrated)	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids and flammable gases.
Oxalic Acid	Silver and mercury.
Perchloric Acid	Acetic anhydride, bismuth and its alloy, alcohol, paper, wood and sulfuric acid.
Phenol	Calcium hypochlorite, aluminum chloride, nitrobenzene and butadiene.
Phosphoric Acid	Strong base.
Picric Acid	Ammonia, bases, concrete and metals.
Potassium	Carbon tetrachloride, carbon dioxide and water.
Potassium chlorate	Sulfuric and other acids.
Potassium perchlorate	Sulfuric and other acids.
Potassium permanganate	Glycerine, ethylene glycol, benzaldehyde and sulfuric acid.
Pyridine	Nitric acid and sulfuric acid
Silver	Acetylene, oxalic acid, tartaric acid, fulminic acid and ammonium compounds.
Sodium	Carbon tetrachloride, carbon dioxide and water.
Sodium Hydroxide	Acetaldehyde, acetic acid, hydrochloric acid, hydrofluoric acid, nitric acid, sulfuric acid and water.
Sodium Nitrate	Antimony, cyanides, sulfur and charcoal.
Sodium Peroxide	Ethyl or methyl alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerine, ethylene glycol, ethyl acetate, methyl acetate, methyl acetate and furfural.
Sulfuric Acid	Potassium chlorate, potassium perchlorate, potassium permanganate (or such compounds with similar light metals, as sodium, lithium etc.)

Toluene	Nitric acid and sulfuric acid.

<u>Note</u>: This list is incomplete. It contains only those most frequently encountered, incorrectly stored in laboratories. Check the NFPA's <u>Fire Protection Guide on Hazardous Materials</u> for additional chemical information.

List of incompatible chemicals can be found in the book, <u>Fire Protection Guide on Hazardous Materials</u>, by the National Fire Protection Association or in Department of Transportation's shipping directives. Other sources of information are the various "Chemical Safety Data Sheets" by the Manufacturing Chemists Association, Inc. and "Materials Safety Data Sheets" (OSHA Form 20) which can be obtained from our suppliers. It is recommended that "Materials Data Sheets" be obtained on all compounds that are potentially hazardous. These contain information concerning incompatibility, safety, health and first aid. This information may prove useful in informing personnel of the hazards and precautions concerning individual materials.