

Incompatibilities of concentrated nitric acid:

Never mix concentrated nitric acid and organics, such as acetone, unless you are following a respectable procedure and use a blast shield and proper precautions.

Never store mixtures of concentrated acids, particularly nitric acid, and organic or inorganic waste components; immediately dilute any mixtures generated from concentrated acids by slow addition to ice or water in an open plastic container or a plastic bottle behind a shield or hood sash.

TABLE 11.35 Some Common Reactive and Incompatible Chemicals

Chemical	Keep out of contact with
Acetic acid	Chromium(VI) oxide, chlorosulfonic acid, ethylene glycol, ethyleneimine, hydroxyl compounds, nitric acid, oleum, perchloric acid, peroxides, permanganates, potassium <i>tert</i> -butoxide, PCl ₃
Acetylene	Bromine, chlorine, brass, copper and copper salts, fluorine, mercury and mercury salts, nitric acid, silver and silver salts, alkali hydrides, potassium metal
Alkali metals	Moisture, acetylene, metal halides, ammonium salts, oxygen and oxidizing agents, halogens, carbon tetrachloride, carbon, carbon dioxide, carbon disulfide, chloroform, chlorinated hydrocarbons, ethylene oxide, boric acid, sulfur, tellurium
Aluminum	Chlorinated hydrocarbons, halogens, steam
Ammonia, anhydrous	Mercury, halogens, hypochlorites, chlorites, chlorine(I) oxide, hydrofluoric acid (anhydrous), hydrogen peroxide, chromium(VI) oxide, nitrogen dioxide, chromyl(VI) chloride, sulfinyl chloride, magnesium perchlorate, peroxydisulfates, phosphorus pentoxide, acetaldehyde, ethylene oxide, acrolein, gold (III) chloride
Ammonium nitrate	Acids, metal powders, flammable liquids, chlorates, nitrites, sulfur, finely divided organic or combustible materials, perchlorates, urea
Ammonium perchlorate	Hot copper tubing, sugar, finely divided organic or combustible materials, potassium periodate and permanganate, powdered metals, carbon, sulfur
Aniline	Nitric acid, peroxides, oxidizing materials, acetic anhydride, chlorosulfonic acid, oleum, ozone
Benzoyl peroxide	Direct sunlight, sparks and open flames, shock and friction, acids, alcohols, amines, ethers, reducing agents, polymerization catalysts, metallic naphthenates
Bromine	Ammonia, carbides, dimethylformamide, fluorine, ozone, olefins, reducing materials including many metals, phosphine, silver azide
Calcium carbide	Moisture, selenium, silver nitrate, sodium peroxide, tin(II) chloride, potassium hydroxide plus chlorine, HCl gas, magnesium
Carbon, activated	Calcium hypochlorite, all oxidizing agents, unsaturated oils
Chlorates	Ammonium salts, acids, metal powders, sulfur, finely divided organic or combustible materials, cyanides, metal sulfides, manganese dioxide, sulfur dioxide, organic acids
Chlorine	Ammonia, acetylene, alcohols, alkanes, benzene, butadiene, carbon disulfide, dibutyl phthalate, ethers, fluorine, glycerol, hydrocarbons, hydrogen, sodium carbide, finely divided metals, metal acetylides and carbides, nitrogen compounds, nonmetals, nonmetal hydrides, phosphorus compounds, polychlorobiphenyl, silicones, steel, sulfides, synthetic rubber, turpentine
Chlorine dioxide	Ammonia, carbon monoxide, hydrogen, hydrogen sulfide, methane, mercury, nonmetals, phosphine, phosphorus pentachloride
Chlorites	Ammonia, organic matter, metals
Chloroform	Aluminum, magnesium, potassium, sodium, aluminum chloride, ethylene, powerful oxidants
Chlorosulfonic acid	Saturated and unsaturated acids, acid anhydrides, nitriles, acrolein, alcohols, ammonia, esters, HCl, HF, ketones, hydrogen peroxide, metal powders, nitric acid, organic materials, water
Chromic(VI) acid	Acetic acid, acetic anhydride, acetone, alcohols, alkali metals, ammonia, dimethylformamide, camphor, glycerol, hydrogen sulfide, phosphorus, pyridine, selenium, sulfur, turpentine, flammable liquids in general
Cobalt	Acetylene, hydrazinium nitrate, oxidants

TABLE 11.35 Some Common Reactive and Incompatible Chemicals (*Continued*)

Chemical	Keep out of contact with	
Copper	Acetylene and alkynes, ammonium nitrate, azides, bromates, chlorates, iodates, chlorine, ethylene oxide, fluorine, peroxides, hydrogen sulfide, hydrazinium nitrate	I I
Copper(II) sulfate	Hydroxylamine, magnesium	F
Cumene hydroperoxide	Acids (inorganic or organic)	F
Cyanides	Acids, water or steam, fluorine, magnesium, nitric acid and nitrates, nitrites	F F
Cyclohexanol	Oxidants	
Cyclohexanone	Hydrogen peroxide, nitric acid	
Decaborane-14	Dimethyl sulfoxide, ethers, halocarbons	F
Diazomethane	Alkali metals, calcium sulfate	
1,1-Dichloroethylene	Air, chlorotrifluoroethylene, ozone, perchloryl fluoride	I
Dimethylformamide	Halocarbons, inorganic and organic nitrates, bromine, chromium(VI) oxide, aluminum trimethyl, phosphorus trioxide	Ic
1,1-Dimethylhydrazine	Air, hydrogen peroxide, nitric acid, nitrous oxide	
Dimethylsulfoxide	Acyl and aryl halides, boron compounds, bromomethane, nitrogen dioxide, magnesium perchlorate, periodic acid, silver difluoride, sodium hydride, sulfur trioxide	Ic
Dinitrobenzenes	Nitric acid	Ic
Dinitrotoluenes	Nitric acid	Ic
1,4-Dioxane	Silver perchlorate	Ir
Esters	Nitrates	Is
Ethylamine	Cellulose, oxidizers	K
Ethers	Oxidizing materials, boron triiodide	Le
Ethylene	Aluminum trichloride, carbon tetrachloride, chlorine, nitrogen oxides, tetrafluoroethylene	Le
Ethylene oxide	Acids and bases, alcohols, air, 1,3-nitroaniline, aluminum chloride, aluminum oxide, ammonia, copper, iron chlorides and oxides, magnesium perchlorate, mercaptans, potassium, tin chlorides, alkane thiols	Le Le Le
Ethyl ether	Liquid air, chlorine, chromium(VI) oxide, lithium aluminum hydride, ozone, perchloric acid, peroxides	
Ethyl sulfate	Oxidizing materials, water	
Flammable liquids	Ammonium nitrate, chromic acid, the halogens, hydrogen peroxide, nitric acid	Le
Fluorine	Isolate from everything; only lead and nickel resist prolonged attack	Le
Formamide	Iodine, pyridine, sulfur trioxide	Lit
Freon 113	Aluminum, barium, lithium, samarium, NaK alloy, titanium	Ma
Glycerol	Acetic anhydride, hypochlorites, chromium(VI) oxide, perchlorates, alkali peroxides, sodium hydride	
Hydrazine	Alkali metals, ammonia, chlorine, chromates and dichromates, copper salts, fluorine, hydrogen peroxide, metallic oxides, nickel, nitric acid, liquid oxygen, zinc diethyl	Ma Ma
Hydrides	Powerful oxidizing agents, moisture	Me
Hydrocarbons	Halogens, chromium(VI) oxide, peroxides	Me
Hydrogen	Halogens, lithium, oxidants, lead trifluoride	
Hydrogen bromide	Fluorine, iron(III) oxide, ammonia, ozone	Mer
Hydrogen chloride	Acetic anhydride, aluminum, 2-aminoethanol, ammonia, chlorosulfonic acid, ethylenediamine, fluorine, metal acetylides and carbides, oleum, perchloric acid, potassium permanganate, sodium, sulfuric acid	Mer Mer
Hydrogen fluoride	Acetic anhydride, 2-aminoethanol, ammonia, arsenic trioxide, chlorosulfonic acid, ethylenediamine, ethyleneimine, fluorine, HgO, oleum, phosphorus trioxide, propylene oxide, sodium, sulfuric acid, vinyl acetate	Mer Mes

TABLE 11.35 Some Common Reactive and Incompatible Chemicals (*Continued*)

Chemical	Keep out of contact with
Hydrogen iodide	Fluorine, nitric acid, ozone, metals
Hydrogen peroxide	Copper, chromium, iron, most metals or their salts, alcohols, acetone, organic materials, flammable liquids, combustible materials
Hydrogen selenide	Hydrogen peroxide, nitric acid
Hydrogen sulfide	Fuming nitric acid, oxidizing gases, peroxides
Hydroquinone	Sodium hydroxide
Hydroxylamine	Barium oxide and peroxide, carbonyls, chlorine, copper(II) sulfate, dichromates, lead dioxide, phosphorus trichloride and pentachloride, permanganates, pyridine, sodium, zinc
Hypochlorites, salts of	Urea, amines, anthracene, carbon, carbon tetrachloride, ethanol, glycerol, mercaptans, organic sulfides, sulfur, thiols
Indium	Acetonitrile, nitrogen dioxide, mercury(II) bromide, sulfur
Iodine	Acetaldehyde, acetylene, aluminum, ammonia (aqueous or anhydrous), antimony, bromine pentafluoride, carbides, cesium oxide, chlorine, ethanol, fluorine, formamide, lithium, magnesium, phosphorus, pyridine, silver azide, sulfur trioxide
Iodine monochloride	Aluminum foil, organic matter, metal sulfides, phosphorus, potassium, rubber, sodium
Iodoform	Acetone, lithium, mercury(II) oxide, mercury(I) chloride, silver nitrate
Iodomethane	Silver chlorite, sodium
Iron disulfide	Water, powdered pyrites
Isothiourea	Acrylaldehyde, hydrogen peroxide, nitric acid
Ketones	Aldehydes, nitric acid, perchloric acid
Lactonitrile	Oxidizing materials
Lead	Ammonium nitrate, chlorine trifluoride, hydrogen peroxide, sodium azide and carbide, zirconium, oxidants
Lead(II) azide	Calcium stearate, copper, zinc, brass, carbon disulfide
Lead chromate	Iron hexacyanoferrate(4-)
Lead dioxide	Aluminum carbide, hydrogen peroxide, hydrogen sulfide, hydroxylamine, nitroalkanes, nitrogen compounds, nonmetal halides, peroxyformic acid, phosphorus, phosphorus trichloride, potassium, sulfur, sulfur dioxide, sulfides, tungsten, zirconium
Lead(II) oxide	Chlorinated rubber, chlorine, ethylene, fluorine, glycerol, metal acetylides, perchloric acid
Lead(II,IV) oxide	Same as for lead dioxide
Lithium hydride	Nitrous oxide, oxygen
Magnesium	Air, beryllium fluoride, ethylene oxide, halogens, halocarbons, HI, metal cyanides, metal oxides, metal oxosalts, methanol, oxidants, peroxides, sulfur, tellurium
Maleic anhydride	Alkali metals, amines, KOH, NaOH, pyridine
Manganese dioxide	Aluminum, hydrogen sulfide, oxidants, potassium azide, hydrogen peroxide, peroxosulfuric acid, sodium peroxide
Mercaptans	Powerful oxidizers
Mercury	Acetylenic compounds, chlorine, fulminic acid, ammonia, ethylene oxide, metals, methyl azide, oxidants, tetracarbonylnickel
Mercury(II) cyanide	Fluorine, hydrogen cyanide, magnesium, sodium nitrite
Mercury(I) nitrate	Phosphorus
Mercury(II) nitrate	Acetylene, aromatics, ethanol, hypophosphoric acid, phosphine, unsaturated organic compounds
Mercury(II) oxide	Chlorine, hydrazine hydrate, hydrogen peroxide, hypophosphorous acid, magnesium, phosphorus, sulfur, butadiene, hydrocarbons, methanethiol
Mesityl oxide	2-Aminoethanol, chlorosulfonic acid, nitric acid, ethylenediamine, sulfuric acid

TABLE 11.35 Some Common Reactive and Incompatible Chemicals (Continued)

Chemical	Keep out of contact with
Methanol	Beryllium dihydride, chloroform, oxidants, potassium <i>tert</i> -butoxide
Methylamine	Nitromethane
<i>N</i> -Methylformamide	Benzenesulfonyl chloride
Methyl isobutyl ketone	Potassium <i>tert</i> -butoxide
Methyl methacrylate	Air, benzoyl peroxide
4-Methylnitrobenzene	Sulfuric acid, tetranitromethane
2-Methylpyridine	Hydrogen peroxide, iron(II) sulfate, sulfuric acid
Methylsodium	4-Chloronitrobenzene
Molybdenum trioxide	Chlorine trifluoride, interhalogens, metals
Naphthalene	Chromium trioxide, dinitrogen pentaoxide
2-Naphthol	Antipyrine, camphor, phenol, iron(III) salts, menthol, oxidizing materials, permanganates, urethane
Neodymium	Phosphorus
Nickel	Aluminum, aluminum(III) chloride, ethylene, 1,4-dioxan, hydrogen, methanol, nonmetals, oxidants, sulfur compounds
Nickel carbonyl	Air, bromine, oxidizing materials
Niobium	Bromine trifluoride, chlorine, fluorine
Nitrates	Aluminum, BP, cyanides, esters, phosphorus, tin(II) chloride, sodium hypophosphite, thiocyanates
Nitric acid, fuming	Organic matter, nonmetals, most metals, ammonia, chlorosulfonic acid, chromium trioxide, cyanides, dichromates, hydrazines, hydrides, HCN, HI, hydrogen sulfide, sulfur dioxide, sulfur halides, sulfuric acid, flammable liquids and gases
Nitric oxide	Aluminum, BaO, boron, carbon disulfide, chromium, many chlorinated hydrocarbons, fluorine, hydrocarbons, ozone, phosphine, phosphorus, hydrazine, acetic anhydride, ammonia, chloroform, Fe, K, Mg, Mn, Na, sulfur
Nitrites	Organic nitrites in contact with ammonium salts, cyanides
Nitrobenzene	Nitric acid, nitrous oxide, silver perchlorate
Nitroethane	Hydroxides, hydrocarbons, metal oxides
Nitrogen trichloride	Ammonia, As, hydrogen sulfide, nitrogen dioxide, organic matter, ozone, phosphine, phosphorus, KCN, KOH, Se, dibutyl ether
Nitrogen dioxide	Cyclohexane, fluorine, formaldehyde, alcohols, nitrobenzene, petroleum, toluene
Nitrogen triiodide	Acids, bromine, chlorine, hydrogen sulfide, ozone
α -Nitroguanidine	Complex salts of mercury and silver
Nitromethane	Acids, alkylmetal halides, hydroxides, hydrocarbons, organic amines, formaldehyde, nitric acid, perchlorates
1-Nitropropane	<i>See under</i> Nitromethane; chlorosulfonic acid, oleum
Nitrosyl fluoride	Haloalkenes, metals, nonmetals
Nitrosyl perchlorate	Acetone, amines, diethyl ether, metal salts, organic materials
Nitrourea	Mercury(II) and silver salts
Nitrous acid	Phosphine, phosphorus trichloride, silver nitrate, semicarbazone
Nitryl chloride	Ammonia, sulfur trioxide, tin(IV) bromide and iodide
Oxalic acid	Furfuryl alcohol, silver, mercury, sodium chlorate, sodium chlorite, sodium hypochlorite
Oxygen	Acetaldehyde, acetone, alcohols, alkali metals, alkaline earth metals, Al-Ti alloys, ether, carbon disulfide, halocarbons, hydrocarbons, metal hydrides, 1,3,5-trioxane
Ozone	Alkenes, aromatic compounds, bromine, diethyl ether, ethylene, HBr, HI, nitric oxide, nitrogen dioxide, rubber, stibine
Palladium	Arsenic, carbon, ozonides, sulfur, sodium tetrahydridoborate
Paraformaldehyde	Liquid oxygen
Paraldehyde	Alkalies, HCN, iodides, nitric acid, oxidizers

TABLE 11.35 Some Common Reactive and Incompatible Chemicals (*Continued*)

Chemical	Keep out of contact with
Pentaborane-9	Dimethylsulfoxide
Pentacarbonyliron	Acetic acid, nitric oxide, transition metal halides, water, zinc
2-Pentanone	Bromine trifluoride
3-Pentanone	Hydrogen peroxide, nitric acid
Perchlorates	Carbonaceous materials, finely divided metals particularly magnesium and aluminum, sulfur, benzene, olefins, ethanol, sulfur, sulfuric acid
Perchloric acid	Acetic acid, acetic anhydride, alcohols, antimony compounds, azo pigments, bismuth and its alloys, methanol, carbonaceous materials, carbon tetrachloride, cellulose, dehydrating agents, diethyl ether, glycols and glycolethers, HCl, HI, hypophosphites, ketones, nitric acid, pyridine, steel, sulfoxides, sulfuric acid
Permanganates	All reducing agents, organic materials
Peroxides	Reducing agents, organic materials, thiocyanates
Peroxoacetic acid	Acetic anhydride, olefins, organic matter
Peroxybenzoic acid	Olefins, reducing materials
Peroxyformic acid	Metals and nonmetals, organic materials
Peroxyosulfuric acid	Acetone, alcohols, aromatic compounds, catalysts
Phenol	Butadiene, peroxydisulfuric acid, peroxyosulfuric acid, aluminum chloride plus nitrobenzene
Phenylhydrazine	Lead dioxide, oxidizers
Phosgene	Aluminum, alkali metals, 2-propanol
Phosphine	Air, boron trichloride, bromine, chlorine, nitric acid, nitrogen oxides, nitrous acid, oxygen, silver nitrate
Phosphorus pentachloride	Aluminum, chlorine, chlorine dioxide, chlorine trioxide, fluorine, magnesium oxide, nitrobenzene, diphosphorus trioxide, potassium, sodium, urea, water
Phosphorus pentafluoride	Water or steam
Phosphorus pentasulfide	Air, alcohols, water
Phosphorus pentoxide	Formic acid, HF, inorganic bases, metals, oxidants, water
Phosphorus, red	Organic materials
Phosphorus tribromide	Potassium, ruthenium tetroxide, sodium, water
Phosphorus trichloride	Acetic acid, aluminum, chromyl dichloride, dimethylsulfoxide, hydroxylamine, lead dioxide, nitric acid, nitrous acid, organic matter, potassium, sodium, water
Phosphorus, white	Air, oxidants of all types, halogens, metals
Phosphoryl chloride	Carbon disulfide, <i>N,N</i> -dimethylformamide, 2,5-dimethylpyrrole, 2,6-dimethylpyridine 1-oxide, dimethylsulfoxide, water, zinc
Phthalic acid	Nitric acid, sodium nitrite
Piperazine	Oxidizers
Platinum	Acetone, arsenic, hydrazine, lithium, peroxyosulfuric acid, phosphorus, selenium, tellurium
Potassium	<i>See under Alkali metals</i>
Potassium <i>tert</i> -butoxide	Organic compounds, sulfuric acid
Potassium hydride	Air, chlorine, acetic acid, acrolein, acrylonitrile, maleic anhydride, nitroparaffins, <i>N</i> -nitrosomethylurea, tetrahydrofuran, water
Potassium perchlorate	Aluminum plus magnesium, carbon, nickel plus titanium, reducing agents, sulfur, sulfuric acid
Potassium permanganate	Organic or readily oxidizable materials
Potassium sodium alloy	Air, carbon dioxide, carbon disulfide, halocarbons, metal oxides
2-Propyn-1-ol	Alkali metals, mercury(II) sulfate, oxidizing materials, phosphorus pentoxide, sulfuric acid
Pyridine	Chlorosulfonic acid, chromium trioxide, formamide, maleic anhydride, nitric acid, oleum, perchromates, silver perchlorate, sulfuric acid
Pyrrolidine	Oxidizing materials

TABLE 11.35 Some Common Reactive and Incompatible Chemicals (*Continued*)

Chemical	Keep out of contact with
Quinoline	Dinitrogen tetroxide, linseed oil, maleic anhydride, thionyl chloride
Salicylic acid	Iodine, iron salts, lead acetate
Silicon	Alkali carbonates, calcium, chlorine, cobalt(II) fluoride, manganese trifluoride, oxidants, silver fluoride, sodium-potassium alloy
Silver	Acetylene, ammonium compounds, ethyleneimine, hydrogen peroxide, oxalic acid, sulfuric acid, tartaric acid
Sodium	<i>See under Alkali metals</i>
Sodium peroxide	Glacial acetic acid, acetic anhydride, aniline, benzene, benzaldehyde, carbon disulfide, diethyl ether, ethanol or methanol, ethylene glycol, ethyl acetate, furfural, glycerol, metals, methyl acetate, organic matter
Sulfides	Acids, powerful oxidizers, moisture
Sulfur	Oxidizing materials, halogens
Sulfur dioxide	Halogens, metal oxides, polymeric tubing, potassium chlorate, sodium hydride
Sulfuric acid	Chlorates, metals, HCl, organic materials, perchlorates, permanganates, water
Sulfuryl dichloride	Alkalis, diethyl ether, dimethylsulfoxide, dinitrogen tetroxide, lead dioxide, phosphorus
Tellurium	Halogens, metals
Tetrahydrofuran	Tetrahydroaluminates, KOH, NaOH
Tetranitroaniline	Reducing materials
Tetranitromethane	Aluminum, cotton, aromatic nitro compounds, hydrocarbons, cotton, toluene
Thiocyanates	Chlorates, nitric acid, peroxides
Thionyl chloride	Ammonia, dimethylsulfoxide, linseed oil, quinoline, sodium
Thiophene	Nitric acid
Thymol	Acetanilide, antipyrine, camphor, chlorhydrate, menthol, quinine sulfate, urethane
Tin(II) chloride	Boron trifluoride, ethylene oxide, hydrazine hydrate, nitrates, Na, K, hydrogen peroxide
Tin(IV) chloride	Alkyl nitrates, ethylene oxide, K, Na, turpentine
Titanium	Aluminum, boron trifluoride, carbon dioxide, CuO, halocarbons, halogens, PbO, nitric acid, potassium chlorate, potassium nitrate, potassium permanganate, steam at high temperatures, water
Toluene	Sulfuric plus nitric acids, nitrogen dioxide, silver perchlorate, uranium hexafluoride
Toluidines	Nitric acid
2,4,6-Trinitrotoluene	Sodium dichromate, sulfuric acid
1,3,5-Trioxane	Oxidizing materials, acids
Urea	Sodium nitrite, phosphorus pentachloride
Vinylidene chloride	Chlorosulfonic acid, nitric acid, oleum

TABLE 11.36 Chemicals Recommended for Refrigerated Storage

A. Due to chemical decomposition or polymerization	
Acetaldehyde	Isoprene
Acrolein	Lecithin
Adenosinetriphosphoric acid	Mercaptoacetic acid
Bromacetaldehyde, diethyl acetal	Methyl acrylate
Bromosuccinimide	2-Methyl-1-butene
3-Buten-2-one	Methylenedi-1,4-phenylene diisocyanate
<i>tert</i> -Butyl hydroperoxide	4-Methyl-1-pentene
2-Chlorocyclohexanone	α -Methylstyrene
Cupferron	1-Naphthyl isocyanate
1,3-Cyclohexadiene	1-Pentene
1,3-Dihydroxy-2-propanone	Isopentyl acetate
Divinylbenzene	Pyruvic acid
Ethyl methacrylate, monomer	Styrene, stabilized
Glutathione	Tetramethylsilane
Glycidol	Thioacetamide
Histamine, base	Veratraldehyde
Hydrocinnamaldehyde	Vitamin E (and the acetate)
B. Due to flammability and high volatility	
Acetaldehyde	Iodomethane
Bromoethane	Isoprene
<i>tert</i> -Butylamine	Isopropylamine
Carbon disulfide	Methylal
1-Chloropropane	2-Methylbutane
3-Chloropropane	2-Methyl-2-butene
Cyclopentane	Methyl formate
Diethyl ether	Pentane
2,2-Dimethylbutane	Propylamine
Dimethyl sulfide	Propylene oxide
Furan	Trichlorosilane

TABLE 11.37 Chemicals Which Polymerize or Decompose on Extended Refrigeration

Formaldehyde	Sodium methoxide
Hydrogen peroxide	Sodium nitrate
Sodium chlorite [sodium chlorate (IV)]	Sodium peroxide
Sodium chromate(VI)	Strontium nitrate
Sodium dithionite	Urea
Sodium ethoxide	

Group 1: Inorganic Acids

Chlorosulfonic acid
Hydrochloric acid (aqueous)
Hydrofluoric acid (aqueous)
Hydrogen chloride (anhydrous)
Hydrogen fluoride (anhydrous)
Nitric acid
Oleum
Phosphoric acid
Sulfuric acid

Group 2: Organic Acids

Acetic acid
Butyric acid (n-)
Formic acid
Propionic acid
Rosin Oil
Tall oil

Group 3: Caustics

Caustic potash solution
Caustic soda solution

Group 4: Amines and Alkanolamines

Aminoethylethanolamine
Aniline
Diethanolamine
Diethylenetriamine
Diisopropanolamine
Dimethylamine
Ethylenediamine
Hexamethylenediamine
2-Methyl-5-ethylpyridine
Monoethanolamine
Monoisopropanolamine
Morpholine
Pyridine
Triethanolamine
Triethylamine
Triethylenetetramine
Trimethylamine

Group 5: Halogenated Compounds

Allyl chloride
Carbon tetrachloride
Chlorobenzene
Chloroform
Chlorohydrines, crude
Dichlorobenzene (o-)
Dichlorobenzene (p-)
Dichlorodifluoromethane
Dichloroethyl ether

Dichloropropane
Dichloropropene
Ethyl chloride
Ethylene dibromide
Ethylene dichloride
Methyl bromide
Methyl chloride
Methylene chloride
Monochlorodifluoromethane
Perchloroethylene
Propylene dichloride
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane
Trichloroethylene
Trichlorofluoromethane

Group 6: Alcohols, Glycols and Glycol Ethers

Allyl alcohol
Amyl alcohol
1,4-Butanediol
Butyl alcohol (iso, n, sec, tert)
Butylene glycol
Corn syrup
Cyclohexyl alcohol
Decyl alcohol (n, iso)
Dextrose solution
Diacetone alcohol
Diethylene glycol
Diethylene glycol dimethyl ether
Diethylene glycol monobutyl ether
Diethylene glycol monoethyl ether
Diethylene glycol monomethyl ether
Diisobutyl carbitol
Dipropylene glycol
Dodecanol
Ethoxylated dodecanol
Ethoxylated pentadecanol
Ethoxylated tetradecanol
Ethoxylated tridecanol
Ethoxytriglycol
Ethyl alcohol
Ethyl butanol
2-Ethylbutyl alcohol
2-Ethylhexyl alcohol
Ethylene glycol
Ethylene glycol monobutyl ether
Ethylene glycol monoethyl ether
Ethylene glycol monomethyl ether
Furfuryl alcohol
Glycerine
Heptanol
Hexanol

**Group 6: Alcohols, Glycols and Glycol Ethers
(cont.)**

Hexylene glycol
Isoamyl alcohol
Isooctyl alcohol
Methoxytriglycol
Methyl alcohol
Methylamyl alcohol
Molasses, all
Nonanol
Octanol
Pentadecanol
Polypropylene glycol methyl ether
Propyl alcohols (n, iso)
Propylene glycol
Sorbitol
Tetradecanol
Tetraethylene glycol
Tridecyl alcohol
Triethylene glycol
Undecanol

Group 7: Aldehydes

Acetaldehyde
Acrolein (inhibited)
Butyraldehyde (n, iso)
Crotonaldehyde
Decaldehyde (n, iso)
2-Ethyl-3-propylacrolein
Formaldehyde solutions
Furfural
Hexamethylenetetramine
Isooctyl aldehyde
Methyl butyraldehyde
Methyl formal
Paraformaldehyde
Valeraldehyde

Group 8: Ketones

Acetone
Acetophenone
Camphor oil
Cyclohexanone
Diisobutyl ketone
Isophorone
Mesityl oxide
Methyl ethyl ketone
Methyl isobutyl ketone

Group 9: Saturated Hydrocarbons

Butane
Cyclohexane

Ethane
Heptane
Hexane
Isobutane
Liquified natural gas
Liquified petroleum gas
Methane
Nonane
n-Paraffins
Pentane
Petrolatum
Petroleum ethers
Petroleum naphtha
Polybutene
Propane
Propylene butylene polymer

Group 10: Aromatic Hydrocarbons

Benzene
Cumene
p-Cymene
Coal tar oil
Diethylbenzene
Dodecyl benzene
Dowtherm
Ethylbenzene
Naphtha, coal tar
Naphthalene (includes molten)
Tetrahydronaphthalene
Toluene
Triethyl benzene
Xylene (m-, o-, p-)

Group 11: Olefins

Butylene
1-Decene
Dicyclopentadiene
Diisobutylene
Dipentene
Dodecene
1-Dodecene
Ethylene
Liquified petroleum gas
1-Heptene
1-Hexane
Isobutylene
Nonene
1-Octene
1-Pentene
Polybutene
Propylene
Propylene butylene polymer

Group 11: Olefins (cont.)

Propylene tetramer (dodecene)
1-Tetradecene
1-Tridecene
Turpentine
1-Undecene

Group 12: Petroleum Oils

Asphalt
Gasolines
 Casingead
 Automotive
 Aviation
Jet Fuels
JP-1 (kerosene)
JP-3
JP-4
JP-5 (kerosene, heavy)
Kerosene
Mineral spirits
Naphtha (non aromatic)
Naphtha
 Solvent
 Stoddard solvent
 VM&P
Oils
 Absorption oil
 Clarified oil
 Crude oil
 Diesel oil
 Fuel oil
 No. 1 (kerosene)
 No. 1-D
 No. 2
 No. 2-D
 No. 4
 No. 5
 No. 6
 Lubricating oil
 Mineral oil
 Mineral seal oil
 Motor oil
 Penetration oil
 Range oil
 Road oil
 Spindle oil
 Spray oil
 Transformer oil
 Turbine oil

Group 13: Esters

Amyl acetate
Amyl tallate
Butyl acetates (n, iso, sec)
Butyl benzyl phthalate
Castor oil
Croton oil
Dibutyl phthalate
Diethyl carbonate
Dimethyl sulfate
Dioctyl adipate
Dioctyl phthalate
Epoxidized vegetable oils
Ethyl acetate
Ethyl diacetate
Ethylene glycol monoethyl ether acetate
Ethylhexyl tallate
Fish oil
Glycol diacetate
Methyl acetate
Methyl amyl acetate
Neatsfoot oil
Olive oil
Peanut oil
Propyl acetates (n, iso)
Resin oil
Soya bean oil
Sperm oil
Tallow
Tanner's oil
Vegetable oil
Wax, carnauba

Group 14: Monomers and Polymerizable esters

Acrylic acid (inhibited)
Acrylonitrile
Butadiene (inhibited)
Butyl acrylate (n, iso)
Ethyl acrylate (inhibited)
2-Ethylhexyl acrylate (inhibited)
Isodecyl acrylate (inhibited)
Isoprene (inhibited)
Methyl acrylate (inhibited)
Methyl methacrylate (inhibited)
o-Propiolactone
Styrene (inhibited)
Vinyl acetate (inhibited)
Vinyl chloride (inhibited)
Vinylidene chloride (inhibited)
Vinyl toluene

Group 15: Phenols

Carbolic oil
Creosote, coal tar
Cresols
Nonylphenol
Phenol

Group 16: Alkylene Oxides

Ethylene Oxide
Propylene Oxide

Group 17: Cyanohydrins

Acetone cyanohydrin
Ethylene cyanohydrin

Group 18: Nitriles

Acetonitrile
Adiponitrile

Group 19: Ammonia

Ammonium hydroxide

Group 20: Halogens

Bromine
Chlorine

Group 21: Ethers

Diethyl ether (ethyl ether)
1, 4, Dioxane
Isopropyl ether
Ethers (cont)
Tetrahydrofuran

Group 22: Phosphorus, elemental**Group 23: Sulfur, molten****Group 24: Acid Anhydride**

Acetic anhydride
Propionic anhydride

Mallinckrodt Specialty Chemicals Co. – Chemical Compatibility List

The following provides some chemicals which are incompatible with other compounds. Avoid contacting, in storage and in working, as explosion or toxic fume or other hazard may result. (SOURCE: Mallinckrodt Specialty Chemicals Co. 5/89)

Incompatible Substances

<u>COMPOUND(S)</u>	<u>INCOMPATIBLE WITH:</u>
Acetic acid	chromic acid, nitric acid, ethylene glycol, perchloric acid, peroxides and permanganates
Acetone	concentrated sulfuric and nitric acid mixtures
Acetylene	copper tubing, fluorine, bromine, chlorine, iodine, silver, mercury
Ammonia anhydrous	mercury, halogens, calcium hypochlorite, hydrogen fluoride (HF)
Ammonium Nitrate	acids, metal powders, flammable liquids, chlorates, nitrates, sulfur, finely divided organics or combustibles
Aniline	nitric acid, hydrogen peroxide
Arsenic compounds	any reducing agent
Azides	acids
Bromine	ammonia, acetylene, butadiene, butane, hydrogen, sodium carbide, turpentine, finely divided metals
Calcium	water, carbon dioxide, carbon tetrachloride, and chlorinated hydrocarbons
Carbon, activated	calcium hypochlorate, all oxidizing agents
Chlorates	ammonium salts, acids, metal powders, sulfur, finely divided organics or combustibles, carbon
Chromic acid	acetic acid, naphthalene, camphor, alcohol, glycerine, turpentine, alkalis, other flammable liquids
Chlorine Dioxide	ammonia, methane, phosphine, hydrogen sulfide
Chlorine	ammonia, acetylene, butadiene, benzene, petroleum fractions, hydrogen, sodium carbide, turpentine, and finely divided metal powders
Copper	acetylene, hydrogen peroxide
Cyanides	acids and alkalis (bases)
Flammable Liquids	ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Fluorine	isolate from everything
Hydrazine	hydrogen peroxide, nitric acid, all oxidizers
Hydrocarbons	fluorine, chlorine, bromine, chromic acid, peroxide
Hydrocyanic acid	nitric acid, alkalis
Hydrofluoric acid	ammonia, alkalis
Hydrogen Sulfide	fuming nitric acid, oxidizing gases
Hypochlorites	acids, activated carbons
Iodine	acetylene, ammonia, hydrogen
Mercury	sulfuric acid

Nitric acid (conc)	acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases, copper, brass, heavy metals
Nitrites	acid
Nitroparaffins	inorganic bases, amines
Oxalic acids	silver, mercury
Oxygen	oils, grease, hydrogen, flammable liquids, solids or gases
Perchloric Acid	acetic anhydride, bismuth, alcohol, paper, wood, oil and grease
Peroxides, organic	acids, friction, heat, sparks
Phosphorous, white	air, oxygen, alkalis, reducing agents
Phosphorous pentoxide	water
Potassium	carbon tetrachloride, carbon dioxide, water
Potassium chlorate	sulfuric and other acids
Potassium perchlorate	sulfuric and other acids (see Chlorates also)
Potassium permanganate	glycerol, ethylene glycol, benzaldehyde, sulfuric acid
Selenides	reducing agents
Silver	acetylene, oxalic acid, tartaric acid, ammonium compounds, fulminic acid
Sodium	carbon tetrachloride, carbon dioxide, water
Sodium nitrite	ammonium nitrate and other ammonium salts
Sodium peroxide	ethyl or methyl alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl or methyl acetate, furfural
Sulfides	acids
Sulfuric Acid	potassium (sodium or lithium) chlorate, perchlorate, or permanganate
Tellurides	reducing agents

