

EH&S Lab Safety Training Handout

UMassAmherst

Environmental Health & Safety

For Medical Emergencies or Any Fire Call 911 or 413-545-3111

When any Incident Occurs in the Lab Call EH&S 413-545-2682



Who we are:

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Departmental Lab Safety Coordinators

Lab Safety Coordinator List by Department

GHS Pictograms and Hazard Classes



Flame

- Flammables
- Pyrophorics
- Self-heating
- Emits flammable gas
- Self-reactive
- Organic peroxides



Exploding Bomb

- Explosives
- Self-reactives
- Organic peroxides



Flame Over Circle

- Oxidizers



Gas Cylinder

- Gases under pressure



Environment (non-mandatory)

- Aquatic toxicity



Corrosion

- Skin corrosion/burns
- Eye damage
- Corrosion to metals



Skull and Crossbones

- Acute toxicity (fatal or toxic)



Health Hazard

- Carcinogen
- Mutagenicity
- Reproductive toxicity
- Respiratory sensitizer
- Target organ toxicity
- Aspiration toxicity



Exclamation Mark

- Irritant (skin and eye)
- Skin sensitizer
- Acute toxicity (harmful)
- Narcotic effects
- Respiratory tract irritant
- Hazardous to ozone layer (non-mandatory)

 Physical hazards

 Physical & health hazards

 Health hazards

 Health & environmental hazards

 Environmental hazards

GHS Hazard Classes and Definitions

Qualitative definitions of the GHS hazard classes are given below along with the various applicable categories. The lower numbered categories always represent the highest level of hazard (eg., For a particular route of exposure, Acute Toxicity, category 1 is more toxic than Acute Toxicity, category 4.) The hazard classes and categories a particular hazardous material is assigned to can be obtained from the material's Safety Data Sheet (SDS). More detailed definitions of the hazard classes listed below, including quantitative criteria, are given in Appendices A and B of 29 CFR 1910.1200.

Acute Toxicity: Adverse effects that arise after short duration exposures of small doses to a particular substance. Route of exposure (oral, dermal, inhalation) must be specified. Categories 1-4.

Skin Corrosion/Irritation: Damage resulting to skin from short term exposure to a particular substance. Corrosion designates irreversible damage, while Irritation designates reversible damage. Categories 1A-C designate Corrosion; Category 2 designates Irritation.

Serious Eye Damage/Irritation: Tissue damage or changes in the eye resulting from single exposure of the eye to a particular substance. Eye Damage indicates irreversible tissue destruction or impairment of vision, and is denoted at Category 1. Eye Irritation indicates a reversible change in the eye, and is denoted by Categories 2A-B.

Respiratory Sensitizer: A chemical that will lead to hypersensitivity of the airways following inhalation of the chemical. Initial exposure creates an induction phase and subsequent exposures create an elicitation phase where immunological response is observed. Categories 1A-B.

Skin Sensitizer: A chemical that will lead to allergic response following skin contact. Initial exposure creates an induction phase and subsequent exposures create an elicitation phase where immunological response is observed. Categories 1A-B.

Germ Cell Mutagenicity: Chemicals which may cause mutations in the germ cells of humans that may be transmitted to progeny. Categories 1A-B, 2.

Carcinogenicity: Chemicals which induce cancer or increase its incidence. Categories 1A-B, 2.

Reproductive Toxicity: Adverse effects on sexual function and fertility in adult humans and/or on the development of offspring produced by exposure to a particular chemical. Categories 1A-B, 2.

Specific Target Organ Toxicity-Single Exposure: Specific, non-lethal organ toxicity resulting from a single exposure to a particular chemical. The target organ is generally specified along with route of exposure. The effects can be either irreversible or reversible. Categories 1-3.

Specific Target Organ Toxicity-Repeated or Prolonged Exposure: Specific target organ toxicity arising from repeated exposure to a particular chemical. The target organ is generally specified along with route of exposure. The effects can be either irreversible or reversible. Categories 1-2.

Aspiration Hazard: May cause chemical pneumonia, varying degrees of pulmonary injury or death following aspiration. Aspiration is entry of a particular liquid or solid chemical directly through the oral or nasal cavity, or indirectly from vomiting, into the trachea and lower respiratory system that is initiated in the time to take one breath. Category 1.

Explosives: A chemical capable of reacting by itself to produce enough gas and/or energy to cause damage to surroundings. Division 1.1-1.6.

Flammable Gases: A gas that can mix with air in small quantity to produce a flammable mixture. Categories 1-2.

Oxidizing Gases: Any gas which contributes to the combustion of materials more than air does. Category 1.

Gases Under Pressure: Includes compressed gases, liquefied gases, refrigerated liquefied gases, and dissolved gases.

Flammable Liquids: Liquids with vapor concentrations near the surface of the liquid capable of igniting at low temperatures (93°C or less). Categories 1-4.

Flammable Solids: Solids capable of being easily ignited by an ignition source such as an open flame or friction. Categories 1-2.

Flammable Aerosols: Non-refillable, pressurized container that contains a flammable liquid, gas or solid. Categories 1-2.

Self-Reactive Chemicals: Thermally unstable chemicals which are capable of undergoing a strong exothermic decomposition even in the absence of oxygen. Categories A-G.

Pyrophoric Liquids: A liquid that is capable of igniting in contact with air. Category 1.

Pyrophoric Solids: A solid that is capable of igniting in contact with air. Category 1.

Self-Heating Chemicals: Reacts with air without a source of energy to produce heat, but will not ignite readily. Categories 1-2.

Chemicals Which, In Contact With Water, Emit Flammable Gases: React with water to become spontaneously flammable or to give off flammable gases in dangerous quantity. Categories 1-3.

Oxidizing Liquids: Liquids which may contribute to the combustion of other materials. Categories 1-3.

Oxidizing Solids: Solids which may contribute to the combustion of other materials. Categories 1-3.

Organic Peroxides: Organic compounds that contain a peroxide (O-O) bond. Peroxides may be unstable and undergo strong exothermic decompositions triggered by friction or shock. Categories A-G.

Corrosive To Metals: A chemical which can react with metals to damage or destroy them.
Category 1.

SAFETY DATA SHEET

Creation Date 28-April-2009

Revision Date 25-April-2019

Revision Number 7

1. Identification

Product Name

Acetone

Cat No. :

A9-4; A9-20; A9-200; A11-1; A11-4; A11-20; A11-200; A11S-4; A13-20;
A13-200; A16F-1GAL; A16P-1GAL; A16P-4; A16S-4; A16S-20; A18-1;
A18-4; A18-20; A18-20LC; A18-200; A18-200LC; A18-500; A18CU1300;
A18FB-19; A18FB-50; A18FB-115; A18FB-200; A18P-4; A18POP-19;
A18POPB-50; A18RB-19; A18RB-50; A18RB-115; A18RB-200;
A18RS-28; A18RS-50; A18RS-115; A18RS-200; A18S-4; A18SK-4;
A18SS-19; A18SS-28; A18SS-50; A18SS-115; A18SS-200; A19-1;
A19-4; A19RS-115; A19RS-200; A40-4; A928-4; A929-1; A929-4;
A929-4LC; A929RS-19; A929RS-50; A929RS-200; A929SK-4;
A929SS-28; A929SS-50; A929SS-115; A929SS-200; A946-4; A946-4LC;
A946FB-200; A946RB-19; A946RB-50; A946RB-115; A946RB-200;
A949-1; A949-4; A949-4LC; A949CU-50; A949N-119; A949N-219;
A949POP-19; A949RS-28; A949RS-50; A949RS-115; A949SK-1;
A949SK-4; A949SS-19; A949SS-28; A949SS-50; A949SS-115;
A949SS-200; BP2403-1; BP2403-4; BP2403-20; BP2404-1; BP2404-4;
BP2404-SK1; BP2404-SK4; HC300-1GAL; S70091; 22050131;
22050295

CAS-No

67-64-1

Synonyms

2-Propanone; Dimethyl ketone; (Certified ACS, HPLC, OPTIMA, Histological,
Spectranalyzed, NF/FCC/EP, Pesticide, Electronic, GC Resolv, SAFE-COTE)

Recommended Use

Laboratory chemicals.

Uses advised against

Food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company

Importer/Distributor

Fisher Scientific
112 Colonnade Road,
Ottawa, ON K2E 7L6,
Canada
Tel: 1-800-234-7437

Manufacturer

Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number

CHEMTREC®, Inside the USA: 800-424-9300

CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

WHMIS 2015 Classification

Classified as hazardous under the Hazardous Products Regulations (SOR/2015-17)

Flammable liquids	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, spleen, Blood.	
Health Hazards Not Otherwise Classified	Category 1
Prolonged or repeated contact may dry skin and cause irritation or cracking	

Label Elements**Signal Word**

Danger

Hazard Statements

Highly flammable liquid and vapor

Causes serious eye irritation

May cause drowsiness and dizziness

May cause damage to organs through prolonged or repeated exposure

Prolonged or repeated contact may dry skin and cause irritation or cracking

**Precautionary Statements****Prevention**

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

Keep container tightly closed

Ground/bond container and receiving equipment

Use explosion-proof electrical/ventilating/lighting/equipment

Use only non-sparking tools

Take precautionary measures against static discharges

Do not breathe dust/fumes/gas/mist/vapours/spray

Wash face, hands and any exposed skin thoroughly after handling

Use only outdoors or in a well-ventilated area

Wear protective gloves/protective clothing/eye protection/face protection

Response

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower

IF INHALED: Remove person to fresh air and keep comfortable for breathing

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

Call a POISON CENTER/ doctor if you feel unwell

In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish

Storage

Store in a well-ventilated place. Keep container tightly closed

Store locked up

Disposal

Dispose of contents/container to an approved waste disposal plant

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Acetone	67-64-1	>95

4. First-aid measures

General Advice	If symptoms persist, call a physician.
Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Inhalation	Move to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
Ingestion	Clean mouth with water and drink afterwards plenty of water.
Most important symptoms/effects	None reasonably foreseeable. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: May cause pulmonary edema: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray.
Unsuitable Extinguishing Media	Water may be ineffective
Flash Point	-20 °C / -4 °F
Method -	Closed cup
Autoignition Temperature	465 °C / 869 °F
Explosion Limits	
Upper	12.8 vol %
Lower	2.5 vol %
Oxidizing Properties	Not oxidising
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Flammable. Risk of ignition. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

Hazardous Combustion Products

Carbon monoxide (CO) Carbon dioxide (CO₂) Formaldehyde Methanol

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health
2Flammability
3Instability
0Physical hazards
N/A

6. Accidental release measures

Personal Precautions

Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions

Should not be released into the environment.

Methods for Containment and Clean Up

Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling

Do not get in eyes, on skin, or on clothing. Wear personal protective equipment. Ensure adequate ventilation. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

Storage

Flammables area. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition.

8. Exposure controls / personal protection

Exposure Guidelines

Component	Alberta	British Columbia	Ontario TWAEV	Quebec	ACGIH TLV	OSHA PEL	NIOSH IDLH
Acetone	TWA: 500 ppm TWA: 1200 mg/m ³ STEL: 750 ppm STEL: 1800 mg/m ³	TWA: 250 ppm STEL: 500 ppm	TWA: 500 ppm STEL: 750 ppm	TWA: 500 ppm TWA: 1190 mg/m ³ STEL: 1000 ppm STEL: 2380 mg/m ³	TWA: 250 ppm STEL: 500 ppm	(Vacated) TWA: 750 ppm (Vacated) TWA: 1800 mg/m ³ (Vacated) STEL: 2400 mg/m ³ (Vacated) STEL: 1000 ppm TWA: 1000 ppm TWA: 2400 mg/m ³	IDLH: 2500 ppm TWA: 250 ppm TWA: 590 mg/m ³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures

Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment.

Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment**Eye Protection**

Goggles

Hand Protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Glove material	Breakthrough time	Glove thickness	Glove comments
Butyl rubber	> 480 minutes	0.5 mm	As tested under EN374-3 Determination of Resistance to Permeation by Chemicals

Inspect gloves before use. observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information) gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion. gloves with care avoiding skin contamination.

Respiratory Protection

When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

Recommended Filter type: low boiling organic solvent Type AX Brown conforming to EN371

When RPE is used a face piece Fit Test should be conducted

Environmental exposure controls

Do not allow material to contaminate ground water system.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing before re-use. Wash hands before breaks and at the end of workday.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	sweet
Odor Threshold	19.8 ppm
pH	7
Melting Point/Range	-95 °C / -139 °F
Boiling Point/Range	56 °C / 132.8 °F
Flash Point	-20 °C / -4 °F
Method -	Closed cup
Evaporation Rate	5.6 (Butyl Acetate = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	12.8 vol %
Lower	2.5 vol %
Vapor Pressure	247 mbar @ 20 °C
Vapor Density	2.0
Specific Gravity	0.790
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	465 °C / 869 °F
Decomposition Temperature	> 4°C
Viscosity	0.32 mPa.s @ 20 °C
Molecular Formula	C3 H6 O
Molecular Weight	58.08
Refractive index	1.358 - 1.359

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Heat, flames and sparks. Incompatible products. Keep away from open flames, hot surfaces and sources of ignition.
Incompatible Materials	Strong oxidizing agents, Strong reducing agents, Strong bases, Peroxides, Halogenated

compounds, Alkali metals, Amines

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO₂), Formaldehyde, Methanol

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Acetone	5800 mg/kg (Rat)	> 15800 mg/kg (rabbit) > 7400 mg/kg (rat)	76 mg/l, 4 h, (rat)

Toxicologically Synergistic Products Carbon tetrachloride; Chloroform; Trichloroethylene; Bromodichloromethane; Dibromochloromethane; N-nitrosodimethylamine; 1,1,2-Trichloroethane; Styrene; Acetonitrile, 2,5-Hexanedione; Ethanol; 1,2-Dichlorobenzene

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Acetone	67-64-1	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)

STOT - repeated exposure Kidney Liver spleen Blood

Aspiration hazard No information available

Symptoms / effects, both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting; May cause pulmonary edema: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Acetone	NOEC = 430 mg/l (algae; 96 h)	Oncorhynchus mykiss: LC50 = 5540 mg/l 96h Alburnus alburnus: LC50 = 11000 mg/l 96h Leuciscus idus: LC50 =	EC50 = 14500 mg/L/15 min	EC50 = 8800 mg/L/48h EC50 = 12700 mg/L/48h EC50 = 12600 mg/L/48h

		11300 mg/L/48h Salmo gairdneri: LC50 = 6100 mg/L/24h		
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Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Acetone	-0.24

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Acetone - 67-64-1	U002	-

14. Transport information

DOT

UN-No UN1090
 Proper Shipping Name ACETONE
 Hazard Class 3
 Packing Group II

TDG

UN-No UN1090
 Proper Shipping Name ACETONE
 Hazard Class 3
 Packing Group II

IATA

UN-No UN1090
 Proper Shipping Name ACETONE
 Hazard Class 3
 Packing Group II

IMDG/IMO

UN-No UN1090
 Proper Shipping Name ACETONE
 Hazard Class 3
 Packing Group II

15. Regulatory information

International Inventories

Component	DSL	NDSL	TSCA	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Acetone	X	-	X	200-662-2	-		X	X	X	X	KE-2936 7

Canada

SDS in compliance with provisions of information as set out in Canadian Standard - Part 4, Schedule 1 and 2 of the Hazardous Products Regulations (HPR) and meets the requirements of the HPR (Paragraph 13(1)(a) of the Hazardous Products Act (HPA)).

Component	Canada - National Pollutant Release Inventory (NPRI)	Canadian Environmental Protection Agency (CEPA) - List of Toxic Substances	Canada's Chemicals Management Plan (CEPA)
Acetone	Part 4 Substance		

16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Creation Date	28-April-2009
Revision Date	25-April-2019
Print Date	25-April-2019
Revision Summary	This document has been updated to comply with the requirements of WHMIS 2015 to align with the Globally Harmonised System (GHS) for the Classification and Labelling of Chemicals.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

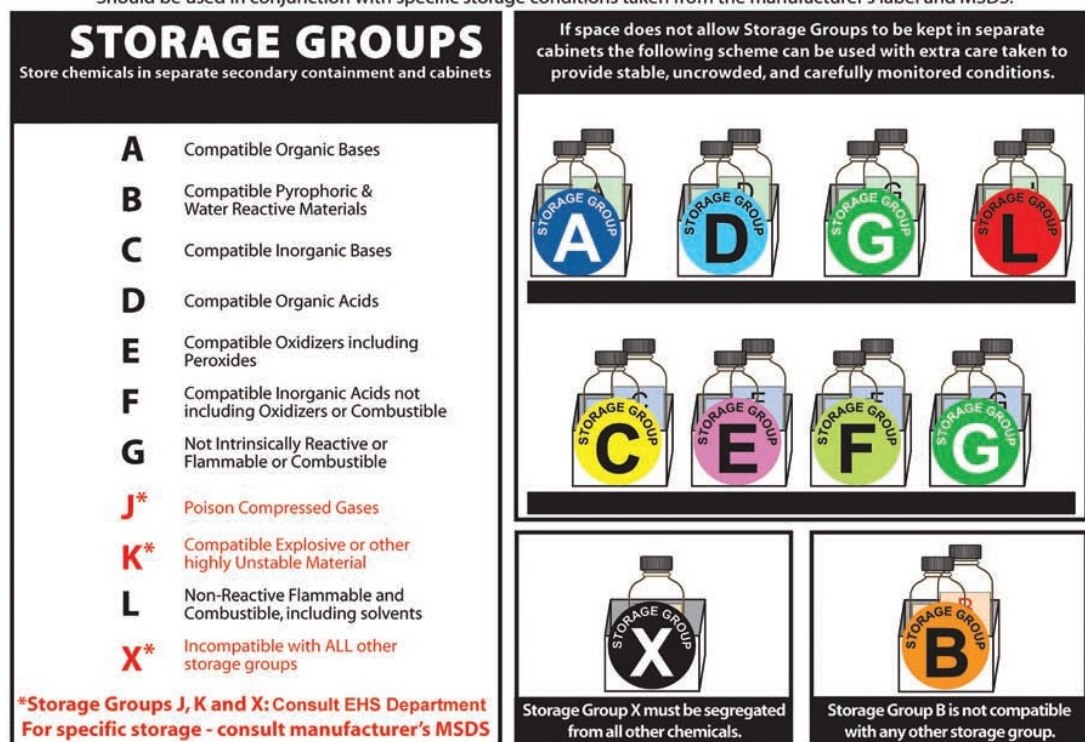


TABLE 5.1 Examples of Compatible Storage Groups

A: Compatible Organic Bases

Diethylamine
Piperidine
Triethanolamine
Benzylamine
Benzyltrimethylammonium hydroxide

B: Compatible Pyrophoric & Water-Reactive Materials

Sodium borohydride
Benzoyl chloride
Zinc dust
Alkyl lithium solutions such as methyl lithium in tetrahydrofuran
Methanesulfonyl chloride
Lithium aluminum hydride

C: Compatible Inorganic Bases

Sodium hydroxide
Ammonium hydroxide
Lithium hydroxide
Cesium hydroxide

D: Compatible Organic Acids

Acetic acid
Citric acid
Maleic acid
Propionic acid
Benzoic acid

E: Compatible Oxidizers Including Peroxides

Nitric acid
Perchloric acid
Sodium hypochlorite
Hydrogen peroxide
3-Chloroperoxybenzoic acid

F: Compatible Inorganic Acids not Including Oxidizers or Combustibles

Hydrochloric acid
Sulfuric acid
Phosphoric acid
Hydrogen fluoride solution

J: Poison Compressed Gases

Sulfur dioxide
Hexafluoropropylene

K: Compatible Explosives or Other Highly Unstable Materials

Picric acid dry (<10% H₂O)
Nitroguanidine
Tetrazole
Urea nitrate

L: Nonreactive Flammables and Combustibles, Including Solvents

Benzene
Methanol
Toluene
Tetrahydrofuran

X: Incompatible with ALL Other Storage Groups

Picric acid moist (10-40% H₂O)
Phosphorus
Benzyl azide
Sodium hydrogen sulfide

Hazardous Waste Management at UMass Amherst

Follow the 5 Ls:

Lids

Close containers when not in use

Leaks

Use secondary containment to catch leaks

Labels

Identify the contents of the container

Location

Keep at or near the point of generation

Check List

Check the area weekly and record results

Hazardous Waste Characteristics

Toxic

Harmful when ingested or absorbed

Ignitable

Flashpoint < 60°C (140°F), oxidizers, or solid waste that can catch fire through friction

Corrosive

pH ≤ 2 or ≥ 12.5

Reactive

Reacts with water, unstable under normal conditions, or may give off toxic gases