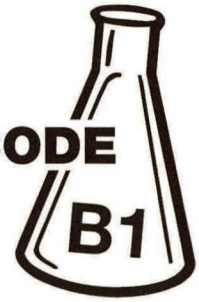
HAZARD AND USEFULNESS CODE



Sodium Hydroxide
caustic soda, soda lye
NaOH
F.W. 40.00

Reagent pellet	S0074	100 g	$ 5.90
	S0075	500 g	10.05
	S0076	2 kg	31.41
Laboratory grade flake	S0279	500 g	$ 5.70
	S0077	2 kg	15.51

★**HAZARD ALERT:** Corrosive solid; skin burns are possible; much heat evolves when added to water; very dangerous to eyes; wear face and eye protection when using this substance. Wear gloves. TLV 2 mg/m^3.
Storage: Inorganic #4
Disposal: #10
Shelf Life: Good; keep tightly closed.
Soluble: Water and alcohol.
Color: White
Odor: None
CAS No. 1310-73-2



HAZARD KEY

A — Extremely hazardous
B — Hazardous
C — Somewhat hazardous
D — Relatively non-hazardous

USE KEY

1 — Very commonly used
2 — Commonly used
3 — Infrequently used
4 — Very infrequently used

HAZARD CODE	USEFULNESS CODE
The alphabetical part of the code (A–D) refers to the relative hazard rating. The hazard code is defined as follows:	The numerical part of the code (1–4), refers to the usefulness rating. Each chemical's usefulness code was based upon how frequently the chemical is used in today's top high school laboratory manuals and science demonstrations. The usefulness code is defined as follows:
A. Extremely Hazardous. This category includes, but is not limited to, concentrated acids, severely toxic, severely corrosive, unstable and/or explosive chemicals.	**1. Very Commonly Used.** Used in approximately 76–100% of high school lab manuals and/or science demonstrations.
B. Hazardous. This category includes, but is not limited to, chemicals that are toxic, corrosive, contain heavy metals, and/or are alleged/proven carcinogens.	**2. Commonly Used.** Used in approximately 51–75% of high school lab manuals and/or science demonstrations.
C. Somewhat Hazardous. This category includes, but is not limited to, chemicals that are highly flammable/combustible, moderately toxic and/or oxidants.	**3. Infrequently Used.** Used in approximately 26–50% of high school lab manuals and/or science demonstrations.
D. Relatively Non-Hazardous. This category includes, but is not limited to, chemicals that are irritants and/or allergens.	**4. Very Infrequently Used.** Used in approximately 0–25% of high school lab manuals and/or science demonstrations.

Hours of research and years of Flinn experience were used in developing this coding system to help you. The Hazard and Usefulness Code is located inside an Erlenmeyer flask under the listing of each chemical in this *Flinn Scientific Catalog/Reference Manual*.

HOW TO USE THE CATALOG/REFERENCE MANUAL CHEMICALS SECTION

Product Name, Quality, Concentration, etc.:

The full chemical name is shown. An alternate name is sometimes shown. A chemical formula is provided as well as the formula weight. The purity grade is included.

Reagent: Highest purity available. Conforms to specifications established by the chemical industry or American Chemical Society. Each batch undergoes an extensive analysis to determine its purity and level of impurities. Use for AP labs and qualitative and quantitative analysis. Guaranteed to give the best results in your lab.

Laboratory Grade: High purity chemicals that meet industry standards. Well suited for most general experiments and demonstrations.

Hazard Alert:

Hazard data is provided to alert the science teacher to the hazardous character of each chemical.

Storage Number:

Number refers to the compatible chemical family in which this item should be stored. A detailed table of these families and even their most compatible shelf order will be found on pages 966–969. Please refer to those reference pages.

Disposal Number:

Suggested disposal techniques for small, laboratory quantities of chemicals are provided in the back of this *Flinn Scientific Catalog/Reference Manual*. The number shown in the chemical listing refers you to a specific and suggested disposal method for that particular product.

Shelf Life:

Through a detailed literature and reference book search, we have attempted to provide a general statement about the anticipated shelf life expectancy of laboratory chemicals in a school setting. Since conditions vary from school building to school building, our shelf life designations are estimates only.

Definition of terms used to describe shelf life.

Excellent: The substance should have a long, useful life under varied storage conditions.

Good: If stored under reasonable conditions of temperature and humidity (25 °C at 50% or less relative humidity), the substance should have a long, useful life.

Fair: If stored under reasonable conditions, the product's useful life may be three years or less.

Poor: Substance does not store well under reasonable conditions.

Indefinite: A term used frequently to communicate the fact that the substance has no fixed or definable life expectancy.

Deliquescent: Substances that tend to absorb atmospheric water and become liquids.

Efflorescent: Combined water molecules lost by hydrates when exposed to air which can possibly result in partial decomposition.

Hygroscopic: A substance that absorbs moisture from the air.

Soluble:

The extent to which a substance would lose its form and become molecularly or ionically dispersed in a solvent to become a solution. Limited space prevents us from listing every possible solvent.

Hydrochloric Acid

12 Molar

ACS reagent	**H0031**	100 mL	**$ 6.51**
37 wt %	**H0004**	500 mL	**13.01**
HCl	**H0005**	2.5 liters	**19.61**
F.W. 36.46	***H0006**	2.5 liters	**22.81**
		(Packaged in PVC-coated bottle)	

★ **HAZARD ALERT:** Highly toxic by ingestion or inhalation; severely corrosive to skin and eyes.

Storage: Inorganic #9 in a dedicated acid cabinet. If one is not available, store in a Flinn *Saf-Cube®*. This product continuously fumes—particularly in a warm, moist environment and is singly responsible for destroying many school storage shelves and cabinets. It deserves special storage attention.

Cap Safety Color Code: Blue

Disposal: #24b

Shelf Life: Good if stored safely.

Soluble: Water

Color: Colorless

Odor: Very strong chlorine

CAS No. 7647-01-0



Safety Purchase Suggestion: Buy and store only small package sizes and small quantities. For safety reasons, Flinn offers larger sizes of hydrochloric acid and other hazardous substances in PVC-coated bottles. We have attempted to price the products in these safer containers as low as possible.

*Hydrochloric acid is exactly as described under Catalog Number H0005 but in a PVC-coated bottle. In the event of breakage, acid and glass shards are safely retained in a PVC outer envelope. *Plas-Pak®* is a safer package for science teachers.

Color and Odor:

Meaningful terminology is used to characterize color and odor. This information is provided as a chemical identity tool. For a complete chart of chemical color/odor identification and mystery substance identification procedures, please contact us.

CAS Number:

CAS means Chemical Abstract Service. Think of this number as an identification number—unique to each substance. A more detailed explanation of CAS numbers is found on page 31 of this catalog.

Safety Purchase Suggestion:

If, in our opinion, you should exercise special caution in acquiring a substance, we alert you to that need.

Technical Note:

We have used this caption to provide technical information; uses, solution preparation, contents or product descriptions.

Catalog Number, Unit of Measure and Price:

Each product has been assigned a catalog number. The unit of measure is almost always specified in metric terms. Prices are guaranteed until 1/31/2004.

A

Abscisic Acid

ABA, dormin, (±) cis-trans isomer
laboratory grade, powder
$C_{15}H_{20}O_4$
F.W. 264.31 **A0298** 25 mg **$45.45**

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite.
Soluble: Acetone, chloroform, ether; slightly soluble in water.
Color: Colorless to white
Odor: None
CAS No. 14375-45-2



Technical Note: Use a 0.1–10.0 mg/L solution as a plant hormone.

Acacia

gum arabic
laboratory grade

Powder	**A0001**	100 g	**$9.05**
Granular	**A0203**	100 g	**8.80**

★ **HAZARD ALERT:** A small portion of the population finds this substance is an allergen.
Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite if dry; store in Flinn *Chem-Saf*® Bag.
Soluble: Water, not alcohol.
Color: Buff
Odor: Slight, musty-like
CAS No. 9000-01-5



Acetaldehyde

laboratory grade
CH_3CHO **A0155** 100 mL **$41.21**
F.W. 44.05

★ **HAZARD ALERT:** *Possible carcinogen;* highly flammable; moderately toxic (narcotic); dangerous fire and explosion risk. May form explosive levels of peroxides on concentration. Cool before opening. Open bottle slowly under a hood. LD_{50} 661 mg/kg. TLV 180 mg/m^3.
Storage: Organic #3. In a dedicated flammables cabinet—if not available, store in Flinn *Saf-Stor*® Can.
Disposal: #2
Shelf Life: Stores well only if kept cool. Do not store in a refrigerator unless it is explosion proof.
Soluble: Miscible with water, alcohol and many common organic solvents.
Color: Colorless
Odor: Pungent, fruity
CAS No. 75-07-0



Acetamide

reagent grade, crystal

CH_3CONH_2	**A0247**	50 g	**$ 6.30**
F.W. 59.07	**A0002**	100 g	**10.75**
M.P. 79–82 °C	**A0003**	500 g	**21.95**

★ **HAZARD ALERT:** *Possible carcinogen;* otherwise low toxicity. Practice strict hygiene in the use of this material. Use gloves, hood. LD_{50} 7000 mg/kg.
Storage: Organic #2 only in a protective bag or can
Disposal: #26a
Shelf Life: Poor; deliquescent; store in Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: Colorless
Odor: Mousy, musty
CAS No. 60-35-5



Continued on next column.

ACETAMIDE *continued*

Safety Purchase Suggestion: This substance is commonly used in melting point determinations. Teachers and students save valuable time using our unique, pre-melted product package described below. Each Pyrex® tube contains 15 grams of ready-to-use acetamide, which reduces exposure to this carcinogen. The tubes can be reused many times.
Technical Note: This substance is commonly used in enthalpy (heat of fusion) experiments. Enthalpy: the amount of heat that a substance has at a given temperature and pressure. The heat of fusion of acetamide is 266 joules per gram.

Acetamide, Tube

reagent grade **A0269** tube/ea. **$7.90**

For hazard alert, storage, disposal, etc., see Acetamide, A0247.
Technical Note: Contains15 grams of acetamide in an 18 × 150 mm Pyrex® test tube. The tube has been massed (±0.01 grams) empty and the weight permanently recorded on the tube. The acetamide that fills the tube has been weighed at 15 grams (±0.01 grams). The tube has been heated to reduce the acetamide to a congealed mass. The student can use the ready-made package with no further preparation for melting point determinations and enthalpy of fusion experiments. A water bath in which to immerse the tube and a thermometer will be required. Each tube is capped and, if treated carefully, can be used for many melting point determinations and enthalpy experiments. This package saves time for the teacher and, more importantly, improves safety.



#1 IN SAFETY

The *Flinn Scientific Catalog/Reference Manual* has been the science teacher's "safety bible" for safe handling, storage, and disposal of laboratory chemicals for more than 15 years. Always depend on Flinn to solve your safety problems!

Acetanilide

laboratory grade, flake

$CH_3CONHC_6H_5$	**A0205**	50 g	**$ 9.00**
F.W. 135.17	**A0004**	100 g	**14.25**

★ **HAZARD ALERT:** Body tissue irritant; moderately toxic by ingestion. LD_{50} 800 mg/kg.
Storage: Organic #2
Disposal: #20
Shelf Life: Indefinite
Soluble: Hot water; alcohol and other organic solvents.
Color: White
Odor: None
CAS No. 103-84-4



Our Philosophy

Flinn Scientific has adopted the philosophy that "Chemicals in any form can be safely stored, handled, or used if the physical, chemical, and hazardous properties are fully understood and the necessary precautions, including the use of proper safeguards and personal protective equipment, are observed."

Acetic Acid

glacial acetic acid, ethanoic acid

17.4 Molar	**A0177**	100 mL	**$ 8.31**
ACS reagent	**A0005**	500 mL	**13.81**
CH_3CO_2H	**A0006**	2.5 liters	**27.91**
F.W. 60.05	***A0007**	2.5 liters	**28.91**
		(5 pt PVC-coated bottle)	

★ **HAZARD ALERT:** Corrosive to skin and tissue; moderate fire risk (flash point: 39 °C); moderately toxic by ingestion and inhalation. LD_{50} 3310 mg/kg. TLV 25 mg/m^3.

Storage: Organic #1 inside a dedicated acid cabinet. *Store away from nitric acid.* If acid cabinet is not available store in Flinn *Saf-Cube®*. Acetic acid crystallizes at 16.6 °C. Room temperature is normally about 25 °C. So, a 10-degree reduction from room temperature will cause the material to crystallize. Return the substance to a warm environment and it will return to a liquid state. Such a freezing/defrosting process does not alter the nature of the substance.

Disposal: #24a

Shelf Life: Indefinite if stored properly. Cap safety color code: Brown.

Soluble: Miscible with water, alcohol, glycerol and ether. Insoluble in carbon disulfide.

Color: Colorless

Odor: Pungent odor; like vinegar.

CAS No. 64-19-7



Safety Purchase Suggestion: Buy and store only small quantities. Please consider buying PVC (polyvinyl chloride)–coated acid bottle—Flinn *Plas-Pak®*.

*Flinn *Plas-Pak®* acetic acid is exactly as described under catalog number A0006 but in a PVC-coated bottle. In the event of breakage, acid and glass shards are retained in a PVC outer envelope. *Plas-Pak®* is a safer package for science teachers.

Acetic Acid, Gramolpak

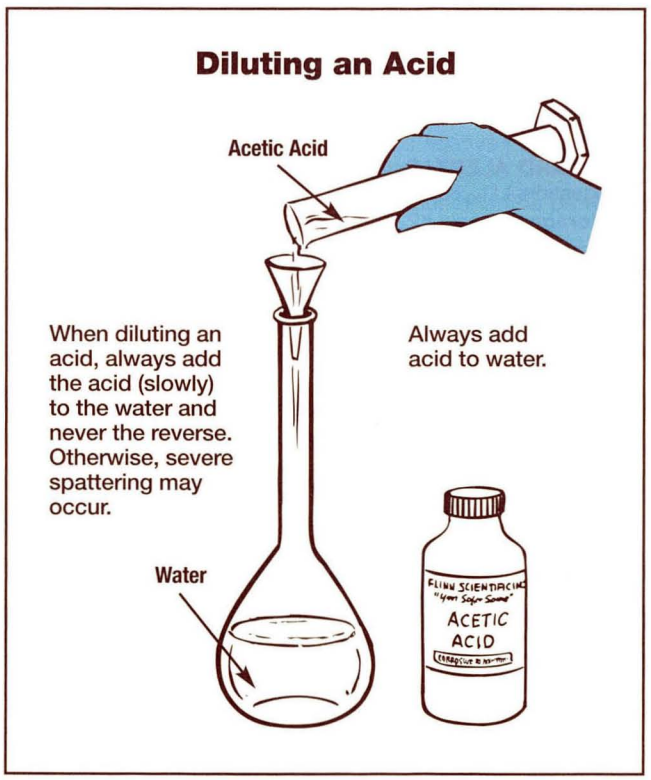
1.0 Molar

(as CH_3CO_2H)	***A0233**	pkg.	**$6.91**

For hazard alert, storage, disposal, etc., see Acetic Acid, A0177.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Acetic Acid Solution

6 Molar*	**A0186**	500 mL	**$ 7.91**
(pH 1.7)	**A0187**	1 liter	**11.51**
1 Molar†	**A0095**	1 liter	**8.35**
(pH 2.4)			
0.1 Molar†	**A0096**	1 liter	**8.00**
(pH 2.9)			

★ **HAZARD ALERT:** Corrosive liquid.

Storage: Organic #1

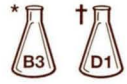
Disposal: #24a

Shelf Life: Good; store in a dedicated acid cabinet.

Color: Colorless

Odor: Strong vinegar

Technical Note: 6 Molar is 36–37% by weight acetic acid.



Acetic Acid

4–8%

see Vinegar

Acetic Anhydride

$(CH_3CO)_2O$

F.W. 102.09

Reagent	**A0156**	100 mL	**$ 8.31**
	A0008	500 mL	**14.51**
Laboratory grade	**A0305**	500 mL	**$11.21**

★ **HAZARD ALERT:** Strongly irritating and corrosive; moderate fire risk (flash point 49 °C); causes severe eye damage; wear eye protection; have access to eyewash. Vapors are strongly irritating; open and dispense in a hood. Reacts (sometimes delayed) violently with water. Moderately toxic by ingestion and inhalation. LD_{50} 1780 mg/kg. TLV 21 mg/m^3.

Storage: Organic #1 inside a dedicated acid cabinet. If one is not available store in a Flinn *Saf-Cube®*.

Disposal: #24a

Shelf Life: Good if stored safely.

Soluble: Slowly soluble in H_2O forming acetic acid; forms ethyl acetate in solution with alcohol.

Color: Colorless

Odor: Strong vinegar

CAS No. 108-24-7



Aceto-Carmine Staining Solution

see Carmine-Aceto Solution



Acetone

reagent grade	**A0009**	500 mL	**$ 5.20**
CH_3COCH_3	**A0010**	4 liters	**21.81**
F.W. 58.08	**A0081**	20 liters	**72.91**

★ **HAZARD ALERT:** Dangerous fire risk; flammable; slightly toxic by ingestion and inhalation. LD_{50} 5.8 g/kg. TLV 1780 mg/m^3.

Storage: Organic #4 inside a dedicated flammables cabinet. If one is not available store in a Flinn *Saf-Stor®* Can. Avoid contact with strong oxidizing agents or with halogenated compounds. Avoid buying 20-liter containers unless you have approved flammable storage area or cabinet.

Disposal: #18a

Shelf Life: Good if stored safely.

Soluble: Miscible with water, alcohol, ether and chloroform.

Color: Colorless

Odor: Sweet, like fingernail polish remover.

CAS No. 67-64-1

Technical Note: Acetone is 13.6 M.



Aceto-Orcein Solution

aqueous staining solution, 2%
contains: acetic acid, orcein and water

*	A0093	20 mL	$11.40
	A0094	100 mL	23.05

★ **HAZARD ALERT:** Slightly corrosive to eyes and skin; moderately toxic by ingestion.
Storage: Organic #1 (acetic acid)
Disposal: #24a
Shelf Life: Good
Color: Red wine
Odor: Vinegar
D3
*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Mystery Substances

Identify chemical unknowns using Flinn's Mystery Substance Identification Procedure. For a free copy of this valuable procedure, send your request to:

Flinn Scientific, Inc.
P.O. Box 219 • Batavia, IL 60510

Acetylcholine Chloride Solution

1/10,000 aqueous solution

	A0184	100 mL	$6.10

Storage: Organic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None
D4

Acetylsalicylic Acid

aspirin
laboratory grade, granular
$2\text{-}CH_3CO_2C_6H_4CO_2H$
F.W. 180.16

A0158	100 g	$11.10
A0133	500 g	31.60

★ **HAZARD ALERT:** An allergen; may cause bleeding after ingestion; 10-gram dose may be fatal. LD_{50} 200 mg/kg. TLV 5 mg/m^3.
Storage: Organic #1 in a poison cabinet
Disposal: #26a
Shelf Life: Poor unless stored in dry environment. Store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, alcohol, chloroform and ether.
Color: White
Odor: When fresh—none; as it ages—vinegar.
CAS No. 50-78-2
C3
Safety Note: Not for human consumption.
Technical Note: See aspirin for aspirin tablets.

Acetylsalicylic Acid

in aspirin tablet form
see Aspirin, Tablets

Acids

see listings in alphabetical order

Acid, Fuchsin

see Fuchsin Acid

Acid Potassium Phthalate

see Potassium Hydrogen Phthalate

Acridine Orange Staining Solution

1%, aqueous solution

*	A0240	20 mL	$3.95
	A0252	100 mL	8.60

★ **HAZARD ALERT:** Skin irritant.
Storage: Organic #9
Disposal: #5
Shelf Life: Indefinite
Color: Orange/brown
Odor: None
CAS No. 10127-02-3
D4
*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Adenine

6-aminopurine
reagent, fine powder
$C_5H_5N_5$
F.W. 135.13

A0102	2 g	$19.25

★ **HAZARD ALERT:** Moderately toxic by ingestion. LD_{50} 745 mg/kg.
Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Boiling water, acids and alkalies, slightly in water.
Color: White
Odor: None
CAS No. 73-24-5
C4

Adenosine Triphosphate, Disodium Salt

ATP
powder
$C_{10}H_{14}N_5O_{13}P_3Na_2 \bullet 3H_2O$
F.W. 605.19

A0239	0.5 g	$13.75
A0083	1 g	24.70

Storage: Organic #2
Disposal: #26a
Shelf Life: Good; stable in acid solution; decomposes in alkali solution.
Soluble: Water; insoluble in most organic solvents.
Color: White
Odor: None
CAS No. 51963-61-2
D4

Adipic Acid

fine crystal
$HO_2C(CH_2)_4CO_2H$
F.W. 146.15

A0255	25 g	$ 5.80
A0159	100 g	10.15

★ **HAZARD ALERT:** Combustible; eye irritant.
Storage: Organic #1
Disposal: #24a
Shelf Life: Fair to poor.
Soluble: Acetone and alcohol; only slightly in water.
Color: White
Odor: None
CAS No. 124-04-9
C4

Student Lab Space

Laboratory overcrowding contributes to many accidents. The National Science Teacher's Association (NSTA) and other professional science teacher organizations have concluded that each student should have 5.6 square meters of space and that the student/teacher ratio should be limited. See our helpful safety article "Overcrowding in the Science Laboratory" on pages 944–945.

Adipoyl Chloride

adipyl chloride
laboratory grade
$ClOC(CH_2)_4COCl$
F.W. 183.03

A0206	10 g	**$27.30**
A0160	25 g	**58.35**

(Both sizes packaged in PVC-coated bottles and then in a metal can for safer storage.)

★ **HAZARD ALERT:** Corrosive liquid; stench; store in a Flinn *Chem-Saf*® Bag.
Storage: Organic #1
Disposal: #1a
Shelf Life: Laboratory grade of adipoyl chloride has a cloudy appearance. A trace amount of a white solid may be present—it will not interfere with the nylon polymerization reaction. Adipoyl chloride stores very poorly. Avoid buying large quantities. If you are planning to use this material for synthesis of nylon, you need only approximately 5 grams. Consider buying ready-made adipoyl chloride/hexane solution. See next listing, Catalog Number A0185.
Color: Colorless
Odor: Offensive stench
CAS No. 111-50-2



Adipoyl Chloride/Hexane Solution

0.25 Molar
(4.6 grams adipoyl chloride in 100 mL hexane)

A0185	100 mL	**$14.95**

★ **HAZARD ALERT:** Flammable liquid; corrosive; stench.
Storage: Organic #3 in a dedicated flammables cabinet.
Disposal: #18b
Shelf Life: Fair
Color: Colorless
Odor: Hexane-like



Technical Note: To prepare nylon, you will need a second solution, hexamethylenediamine/sodium hydroxide solution (see page 93). Also see the nylon demonstration kit on page 354.

DL-Adrenaline

epinephrine
reagent
$C_9H_{13}NO_3$
F.W. 183.21

A0011	1 g	**$19.25**

★ **HAZARD ALERT:** Toxic by ingestion. LD_{50} 50 mg/kg.
Storage: Organic #2
Disposal: #26a
Shelf Life: Fair to poor
Soluble: Sparingly soluble in water or alcohol.
Color: Buff
Odor: None
CAS No. 329-65-7



L-Adrenaline

epinephrine
reagent
$C_9H_{13}NO_3$
F.W. 183.21

A0299	1 g	**$24.10**

★ **HAZARD ALERT:** Toxic by ingestion. LD_{50} 50 mg/kg.

Continued on next column.

L-ADRENALINE *continued*

Storage: Organic #2
Disposal: #26a
Shelf Life: Fair to poor
Soluble: Sparingly soluble in water or alcohol.
Color: Buff
Odor: None
CAS No. 51-43-4



Adrenalin Chloride Solution

0.01% w/v aqueous solution
0.5% HCl added

A0092	100 mL	**$5.60**

★ **HAZARD ALERT:** Toxic by ingestion or injection.
Storage: Organic #2
Disposal: #26b
Shelf Life: Fair to poor
Color: Colorless
Odor: None



Agar

base media for bacteriological cultures

Laboratory grade*	**A0256**	25 g	**$ 6.75**
100 mesh, granular	**A0012**	100 g	**12.80**
	A0013	500 g	**45.35**
Bacteriological grade†	**A0257**	25 g	**$10.25**
powder	**A0084**	100 g	**17.95**
	A0085	500 g	**54.50**

Storage: Miscellaneous non-hazardous organic material.
Disposal: #26a
Shelf Life: Good if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Slowly soluble in hot water.
Color: Buff
Odor: None
CAS No. 9002-18-0



Technical Note: Nutrients must be added to agar for microbial growth. See tables of culture media and ingredients on page 642.

Agarose

low EEO, < 0.15	**A0132**	10 g	**$22.95**
electrophoresis grade	**A0307**	25 g	**47.95**

Storage: Miscellaneous non-hazardous organic material.
Disposal: #26a
Shelf Life: Good, if kept dry.
Soluble: Soluble in boiling water.
Color: Buff
Odor: None
CAS No. 9012-36-6



Aitch-tu-ess Cartridges (H_2S)

H_2S producing cartridges

A0173	each	**$ 2.40**
A0232	dozen	**14.95**

★ **HAZARD ALERT:** Generates explosive and poisonous hydrogen sulfide gas. Ventilation is important when using these cartridges.
Storage: In a dedicated flammables cabinet or Flinn *Saf-Stor*® Can.
Disposal: #18b with caution
Shelf Life: Indefinite
Soluble: Not meant to be placed into solution.
Color: Green/white
Odor: None



Technical Note: Aitch-tu-ess cartridges are 1⅛″ × 1″ vials. Each vial contains 5 grams of a dry mixture of sulfur, sand, granular asphalt and blue dye. Place entire contents in a test tube. Upon heating, 1250 mL of H_2S will be produced.

DL-Alanine

amino acid, crystal
$CH_3CH(NH_2)CO_2H$ **A0134** 50 g **$16.95**
F.W. 89.09

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 71261-64-8



L-Alanine

amino acid, crystal
$CH_3CH(NH_2)CO_2H$ **A0114** 5 g **$21.35**
F.W. 89.09

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 56-41-7



Albumin

protein, laboratory grade, fine powder

Egg albumin	**A0258**	25 g	**$ 6.30**
	A0014	100 g	**7.95**
	A0015	500 g	**23.35**
Bovine serum albumin fraction V	**A0300**	10 g	**$30.60**

Storage: Organic #2
Disposal: #26a
Shelf Life: Fair to poor; altered by heat and moisture; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: Light yellow
Odor: Slightly musty
CAS No. 9006-59-1



Alcohols

see individual alphabetical listings; e.g., Methyl Alcohol

Alcohol, Burner Fuel

see Ethyl Alcohol, burner fuel

Alconox®

see Cleaner, Alconox®

Alizarin

Mordant Red 11
biological stain or indicator
pH 5.5 yellow to 6.8 red and
11.0 red to 12.4 purple
$C_{14}H_8O_4$ **A0207** 5 g **$11.40**
F.W. 240.21

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Many organic solvents; ether; hot methyl alcohol; insoluble in water.
Color: Orange/red
Odor: None
CAS No. 72-48-0
C.I. #58000



Alizarin Red S

Mordant Red 3
biological stain or indicator
pH range 4.6 yellow to 6.0 red

$C_{14}H_7N_2O_7S$	**A0209**	5 g	**$7.60**
F.W. 342.26	**A0117**	10 g	**9.65**

★ **HAZARD ALERT:** Body tissue irritant.
Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Many organic solvents; ether; hot methyl alcohol and in water.
Color: Burgundy
Odor: None
CAS No. 130-22-3
C.I. #58005



Alizarin Red S Staining Solution

1%, aqueous solution
A0260 100 mL **$8.05**

For storage, disposal, etc., see Alizarin Red S, A0209.
Color: Red
Odor: None



Alizarin Yellow R

Mordant Orange 1, sodium salt
biological indicator or stain

10.2 yellow to 12.2 red	**A0261**	1 g	**$ 5.05**
$C_{13}H_8N_3O_5Na$	**A0210**	5 g	**10.05**
F.W. 309.2	**A0136**	10 g	**9.95**

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Many organic solvents; ether; hot methyl alcohol and slightly in water.
Color: Brown/orange
Odor: None
CAS No. 2243-76-7
C.I. #14030



Technical Note: To make 0.1% solution add 0.1 grams to 100 mL of distilled water. Do not prepare a large amount since basic indicator solutions do not store well. Color change: yellow to red or violet.

Alizarin Yellow R Indicator Solution

0.1%, aqueous solution

* **A0244**	20 mL	**$4.10**
A0250	100 mL	**5.25**

For storage, disposal, etc., see Alizarin Yellow R, A0261.
Color: Amber
Odor: None



*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Alkaline Potassium Iodide

see Winkler's Solution #2

How to Use a Fire Extinguisher

It seems so simple! Pull the pin, point the extinguisher nozzle and press the lever that releases the extinguisher's contents. If you have never used a hand-held extinguisher, the time to learn is ***before*** an emergency occurs. Ask your local fire protection professionals for a lesson in fire extinguisher use. How to use a hand-held extinguisher makes a great in-service session. Your local fire department will be glad to help.

Alka-Seltzer®

tablets A0111 pkg./24 $7.65

Special Note: For laboratory use only; not for human consumption.

D2

Alum

see Aluminum Potassium Sulfate

Alumina

see Aluminum Oxide

Aluminon

see Aurin Tricarboxylic Acid

Aluminum, Foil

Al
A.W. 26.98

Household type A0019 each roll $2.50
0.0007″ thick
12″ wide × 25′ long roll

Heavy-Duty type A0020 each roll $3.50
0.0015″ thick
18″ wide × 25′ long roll

Storage: Inorganic #1
Disposal: #26a
Shelf Life: Indefinite
Color: Shiny, silver-like
Odor: None
CAS No. 7429-90-5

D1

Aluminum, Granular

5 mesh and finer A0022 100 g $ 6.00
A0223 500 g 14.65

For storage, disposal, etc., see Aluminum, Foil, A0019.

D2

Aluminum, Powder

100 mesh A0021 100 g $ 6.71
A0222 500 g 13.51

★ **HAZARD ALERT:** Fine metal powders form an explosive mixture with air. TLV 10 mg/m^3 as dust.
Storage: Inorganic #1
Disposal: #26a
Shelf Life: Indefinite
Color: Light gray
Odor: None
CAS No. 7429-90-5

C4

Incompatibility: Strong oxidizing agents; metal oxides; sulfur, halogens, ammonium nitrate, carbon dioxide, alcohols and silver nitrate.

Aluminum, Sheet

each piece 12″ × 12″

#22 Gauge A0017 $7.10
0.025″ thick Weight: approx. 200 grams

#30 Gauge A0018 $9.90
0.010″ thick Weight: approx. 100 grams

For storage, disposal, etc., see Aluminum, Foil, A0019.

D3

Total Lifetime Cost of a Chemical

Administrators who purchase low-priced chemicals fail to understand the true "lifetime cost" of a chemical. The lifetime cost includes not only the cost to purchase the chemical, but also the cost to store and dispose of the material. Cheap chemicals typically are lower quality and packaged in inferior containers. This greatly increases the amount of chemicals needing expensive disposal. Save money by relying on Flinn to provide smaller quantities of higher quality chemicals in date-labeled packages.

Aluminum, Shot

2–5 mesh A0262 100 g $5.40
A0023 500 g 9.95

For storage, disposal, etc., see Aluminum, Foil, A0019.

D3

Aluminum, Strips

.010″ thick A0178 pkg./10 $5.10
each strip 6″ × ½″

For storage, disposal, etc., see Aluminum, Foil, A0019.

D3

Aluminum, Wire

16 gauge A0175 100 g $11.15
approx. 0.94 ft/g A0121 500 g 19.55

For storage, disposal, etc., see Aluminum, Foil, A0019.

D3

Aluminum Ammonium Sulfate

ammonium alum
reagent
$AlNH_4(SO_4)_2 \cdot 12H_2O$ A0224 100 g $ 7.65
F.W. 453.32 A0025 500 g 15.40

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water, glycerol; not alcohol.
Color: White
Odor: None
CAS No. 7784-26-1

D4

Aluminum Chloride

crystal
$AlCl_3 \cdot 6H_2O$
F.W. 241.43

Reagent A0225 100 g $ 7.55
A0026 500 g 15.90

Laboratory grade A0179 500 g $13.80

★ **HAZARD ALERT:** Slightly toxic by ingestion; body tissue irritant. LD_{50} 3310 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 7784-13-6

D2

Aluminum Chloride

reagent, anhydrous
$AlCl_3$ A0263 25 g $13.91
F.W. 133.35 A0139 100 g 33.41
(Both package sizes packaged in wax sealed, PVC-coated bottles)

★ **HAZARD ALERT:** Reacts very violently with water; corrosive to all body tissue.
Storage: Inorganic #9 in a dedicated acid cabinet inside a Flinn *Chem-Saf*® Bag.
Disposal: #1b. ***Treat this material carefully.***
Shelf Life: Poor; constantly evolves hydrochloric acid. Do not store in warm, humid environment.
Soluble: Water; reacts violently with water.
Color: Light yellow
Odor: Strong hydrochloric acid
CAS No. 7446-70-0

A4

Incompatibility: Water
Safety Purchase Suggestion: Buy only small quantity, but if you cannot provide safe, dry, cool storage do not buy this item at all.

Aluminum Chloride Solution

0.2 Molar
(as $AlCl_3 \cdot 6H_2O$) **A0276** 500 mL **$4.65**

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: None



Aluminum Hydroxide

laboratory grade, powder

$Al(OH)_3 \cdot xH_2O$	**A0264**	100 g	**$ 7.55**
F.W. 78.00	**A0028**	500 g	**11.85**

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Insoluble in water; acids and alkalies.
Color: White
Odor: None
CAS No. 21645-51-2



Aluminum Nitrate

reagent, crystal

$Al(NO_3)_3 \cdot 9H_2O$	**A0029**	100 g	**$ 7.71**
F.W. 375.13	**A0030**	500 g	**16.31**

★ **HAZARD ALERT:** Strong oxidizer; slightly toxic by ingestion. LD_{50} 3671 mg/kg.
Storage: Inorganic #3
Disposal: #26a
Shelf Life: Indefinite
Soluble: Cold water; decomposes in hot water; alcohol and acetone.
Color: White
Odor: Very slight ammonia
CAS No. 7784-27-2



Aluminum Nitrate, Gramolpak

0.1 Molar
(as $Al(NO_3)_3 \cdot 9H_2O$) * **A0286** pkg. **$5.75**

For hazard alert, storage, disposal, etc., see Aluminum Nitrate, A0029.
*Gramolpak® is a unique package which makes 1 liter with distilled water.



Aluminum Nitrate Solution

0.1 Molar
(as $Al(NO_3)_3 \cdot 9H_2O$) **A0277** 500 mL **$4.55**

Storage: Inorganic #3
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: None



Aluminum Oxide

reagent, fine crystal

Al_2O_3	**A0161**	100 g	**$10.35**
F.W. 101.96	**A0031**	500 g	**14.20**

★ **HAZARD ALERT:** Body tissue irritant; avoid inhalation of dust.
Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Insoluble in water; difficult to dissolve in acids or alkali.
Color: White
Odor: None
CAS No. 1344-28-1



Aluminum Potassium Sulfate

alum, crystal
$AlK(SO_4)_2 \cdot 12H_2O$
F.W. 474.39

Reagent	**A0265**	100 g	**$ 5.80**
	A0032	500 g	**15.60**
	A0033	2 kg	**30.05**
Laboratory grade	**A0180**	500 g	**$ 7.00**
	A0181	2 kg	**22.10**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 7784-24-9



Aluminum Sodium Sulfate

laboratory grade, powder

$AlNa(SO_4)_2 \cdot 12H_2O$	**A0034**	500 g	**$7.00**
F.W. 458.27			

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 10102-71-3



Aluminum Sulfate

$Al_2(SO_4)_3 \cdot 18H_2O$
F.W. 666.42

Reagent	**A0162**	100 g	**$ 7.20**
crystal	**A0035**	500 g	**14.50**
Laboratory grade	**A0036**	500 g	**$ 6.20**
granular	**A0037**	2 kg	**15.35**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 17927-65-0



Technical Note: The laboratory grade is approximately $18H_2O$.

Aluminum Sulfate, Gramolpak

0.1 Molar
(as $Al_2(SO_4)_3 \cdot 18H_2O$) * **A0287** pkg. **$7.65**

For storage, disposal, etc., see Aluminum Sulfate, A0162.
*Gramolpak® is a unique package which makes 500 mL with distilled water.



Wear Your Goggles!

How many times a year do you say this? Having a firm goggle policy and taking a proactive disciplinary stance when the policy is violated will force students to wear their goggles. One teacher idea for enforcing her goggle policy is to write safety violations every time students are caught not wearing their goggles. Three violations and students must retake a safety exam before they are allowed back into lab. Firm policies are easy to follow and enforce and will make your lab safer.

Aluminum Sulfate Solution

0.1 Molar
(as $Al_2(SO_4)_3$) **A0279** 500 mL **$8.50**
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: None



Aluminum Trioxide

see Aluminum Oxide

Amino Acids

see individual listings, e.g., Alanine

Amino Acetic Acid

see Glycine

o-Aminobenzoic Acid

see Anthranilic Acid

5-Amino-2,3-Dihydro-1,4-Phthalazinedione

see Luminol

Ammonia

household ("sudsy") **A0038** 64 oz. **$3.15**
10% or less ammonia in aqueous solution

★ **HAZARD ALERT:** Slightly toxic by ingestion and inhalation; both liquid and vapor extremely irritating, especially to the eyes.
Storage: Inorganic #4
Disposal: #26b
Shelf Life: Indefinite
Soluble: Water
Color: Milky
Odor: Strong ammonia
CAS No. 7664-41-7



Ammonia

stronger than household solution, see Ammonium Hydroxide and Ammonium Hydroxide solutions

Ammonia, Gas

anhydrous
lecture bottle
NH_3 **LB1000** 0.4 lb **$167.41**
F.W. 17.03 (approximately 250 liters)

Due to D.O.T. regulations, this product must be shipped via truck. Truck freight is very expensive, $75 or more. Try to order with as many other items as possible to justify this very high shipping cost.

Continued on next column.

What Is a Gramolpak®?

A package that contains exactly the amount of chemical to make a solution of the stated concentration when added to a specified quantity (usually a liter) of distilled water. Empty the Gramolpak into a volumetric flask (size of flask depends on directions with each Gramolpak). Wash residue from Gramolpak and add the washings to the flask. Fill flask to specified volume.



AMMONIA, GAS *continued*

★ **HAZARD ALERT:** Corrosive to eyes, respiratory tract, and skin; moderately toxic by inhalation and ingestion. Use only under fume hood; moderate fire risk. Stainless steel control valve required for use with Ammonia, Gas. See gas listing section in apparatus section of this Catalog/Reference Manual. TLV 17 mg/m^3.
Storage: In an area dedicated to bottled gases; store away from any source of heat.
Disposal: Completely empty lecture bottle in an operating fume hood, then follow #26a.
Shelf Life: Indefinite if stored safely.
Soluble: Water and alcohol
Color: None
Odor: Strong ammonia
CAS No. 7664-41-7
Incompatibility: Halogens, mercury, silver salts
Special Note: Ammonia gas lecture bottle is color-coded solid black.





Ammonium Acetate

reagent, crystal
$NH_4C_2H_3O_2$ **A0039** 100 g **$10.40**
F.W. 77.08 **A0040** 500 g **23.65**
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White
Odor: Weak ammonia
CAS No. 631-61-8



Ammonium Acetate, Gramolpak

1 Molar
(as $NH_4C_2H_3O_2$) * **A0288** pkg. **$8.05**
For storage, disposal, etc., see Ammonium Acetate, A0039.
*Gramolpak® is a unique package which makes 500 mL with distilled water.





Ammonium Acetate Solution

(as $NH_4C_2H_3O_2$)
1 Molar **A0189** 500 mL **$8.65**
0.1 Molar **A0190** 500 mL **5.80**
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Ammonium Bicarbonate

reagent
NH_4HCO_3 **A0082** 25 g **$ 6.00**
F.W. 79.06 **A0125** 100 g **13.25**

★ **HAZARD ALERT:** Creates irritating fumes when heated.
Storage: Inorganic #4
Disposal: #10
Shelf Life: Good
Soluble: Water
Color: White
Odor: Slight ammonia
CAS No. 1066-33-7



Ammonium Bromide

reagent, fine crystal
NH_4Br
F.W. 97.94

A0163	100 g	$14.85

★ **HAZARD ALERT:** Moderately toxic by ingestion and inhalation.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; hygroscopic, store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White
Odor: Faint ammonia
CAS No. 12124-97-9



Ammonium Carbonate

reagent, lump
$(NH_4)_2CO_3$
F.W. 96.09

A0226	100 g	$ 8.35
A0043	500 g	11.45

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water (decomposes in hot water)
Color: White
Odor: Strong ammonia
CAS No. 506-87-6



Technical Note: Decomposes to ammonia and carbon dioxide at temperatures over 58 °C (136 °F).

Ammonium Carbonate Solution

0.1 Molar
(as $(NH_4)_2CO_3$)

A0191	500 mL	$6.00

For hazard alert, storage, etc., see Ammonium Carbonate, A0226.
Disposal: #26b
Color: Colorless
Odor: None





Ammonium Chloride

sal ammoniac
granular
NH_4Cl
F.W. 53.49

Reagent	A0266	100 g	$ 4.95
	A0044	500 g	9.45
Laboratory grade	A0045	500 g	$ 5.85
	A0046	2 kg	14.50

★ **HAZARD ALERT:** Slightly toxic by ingestion. LD_{50} 1650 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; hygroscopic; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and glycerol; slightly in alcohol.
Color: White
Odor: None
CAS No. 12125-02-9



Ammonium Chloride Solution

1 Molar
(as NH_4Cl)

A0278	500 mL	$4.65

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Color: Colorless
Odor: None



Ammonium Chromate

reagent, neutral
$(NH_4)_2CrO_4$
F.W. 152.09

A0267	10 g	$10.25
A0164	25 g	21.75

★ **HAZARD ALERT:** Moderately toxic by ingestion; strong irritant.
Storage: Inorganic #8
Disposal: #12a
Shelf Life: Indefinite
Soluble: Cold water; not alcohol.
Color: Mustard
Odor: None
CAS No. 7788-98-9



Ammonium Citrate

dibasic
reagent, crystal
$(NH_4)_2HC_6H_5O_7$
F.W. 226.19

A0108	100 g	$15.05
A0231	500 g	51.70

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 3012-65-5



Ammonium Dichromate

reagent, crystal
$(NH_4)_2Cr_2O_7$
F.W. 252.06

A0047	100 g	$ 7.41
A0048	500 g	18.91
A0049	2 kg	78.21

★ **HAZARD ALERT:** Very strong oxidizing agent; dangerous fire risk; dusts and solutions are toxic; irritant to eyes and skin; *known carcinogen*.
Storage: Inorganic #8
Disposal: #12a
Shelf Life: Fair to poor; decomposes with slight heating; keep away from all organic materials.
Soluble: Water and alcohol
Color: Orange
Odor: None
CAS No. 7789-09-5



Incompatibility: Reducing agents; powdered metals; explosive mixture with magnesium, metal, powder.

★ **SPECIAL HAZARD ALERT:** Attention, science teachers thinking of doing the "volcano" experiment or demonstration with ammonium dichromate. Ammonium dichromate decomposes upon heating to produce nitrogen, water and chromium (III) oxide. Chromium compounds have been associated with cancer. It is wise to do this demonstration under a hood or out of doors. Never do the "volcano" demonstration in a closed, poorly ventilated room. Practice strict hygiene in handling the substance before and after combustion.

Ammonium Dihydrogen Phosphate

see Ammonium Phosphate, Monobasic

Ammonium Ferrous Sulfate

see Ferrous Ammonium Sulfate

Eliminate Mystery Substances at Their Source

Become a label fanatic! Eliminate future mystery substances by labeling all chemical solutions and preparations when they are made. Today's unlabeled bottle is tomorrow's mystery substance. Try Flinn's new labeling program (page 905) to prepare professional-looking labels that will last for years.

Ammonium Fluoride

reagent, crystal
NH_4F A0268 25 g $19.40
F.W. 37.04

★ **HAZARD ALERT:** Corrosive to tissue; toxic by ingestion and inhalation.

Storage: Inorganic #2
Disposal: #6
Shelf Life: Indefinite
Soluble: Cold water
Color: White
Odor: None
CAS No. 12125-01-8



Ammonium Hydroxide

14.8 Molar

ACS reagent	A0174	100 mL	$ 7.31
28–30% NH_3	A0051	500 mL	9.91
NH_4OH	A0052	2.5 liters	16.41
F.W. 35.05	* A0227	2.5 liters (PVC-coated bottle)	23.31

★ **HAZARD ALERT:** Both liquid and vapor are extremely irritating—especially to eyes. Dispense in a hood and be sure an eyewash is accessible. Moderately toxic by ingestion and inhalation. Serious respiratory hazard. LD_{50} 350 mg/kg.

Storage: Inorganic #4 in a dedicated base cabinet. If one is not available store in a Flinn *Saf-Cube*®.
Disposal: #10
Shelf Life: Indefinite if stored safely.
Color: Colorless
Odor: Strong ammonia
CAS No. 1336-21-6
Cap Color Code: Green



Safety Purchase Consideration: Buy and store only small package sizes and small quantities. For safety reasons, Flinn offers larger sizes of ammonium hydroxide and other hazardous substances in PVC-coated bottles. We have attempted to price the products in these safer containers as low as possible.

Continued on next column.

AMMONIUM HYDROXIDE *continued*

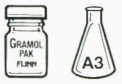
*Ammonium hydroxide is exactly as described under catalog number A0052 but in a PVC-coated bottle. In the event of breakage, base and glass shards are safely retained in a PVC outer envelope. *Plas-Pak*® is a safer package for science teachers.

Ammonium Hydroxide, Gramolpak

1.0 Molar
(as NH_4OH) * A0235 pkg. $6.21

For hazard alert, storage, disposal, etc., see Ammonium Hydroxide, A0174.

*Gramolpak® is a unique package which makes 1 liter with distilled water.

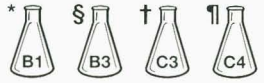


Ammonium Hydroxide Solution

(as NH_4OH)

6 Molar*	A0192	500 mL	$6.91
3 Molar§	A0193	500 mL	5.45
1.0 Molar†	A0097	1 liter	8.80
0.5 Molar¶	A0194	500 mL	5.60
0.1 Molar†	A0098	1 liter	8.20

For hazard alert, storage, disposal, etc., see Ammonium Hydroxide, A0174.



Ammonium Iodide

reagent, crystal
NH_4I A0280 25 g $15.75
F.W. 144.94

★ **HAZARD ALERT:** Moderately toxic; irritates skin.

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; hygroscopic; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and glycerol; slightly in alcohol.
Color: White
Odor: None
CAS No. 12027-06-4



Flinn Bases: The Safer Choice

Ammonium hydroxide is an essential part of any chemical laboratory but is also one of the more hazardous. Flinn makes it safer by providing PVC-coated bottles, Flinn *Saf-Cube*®, and premixed solutions.



Safer Bottles

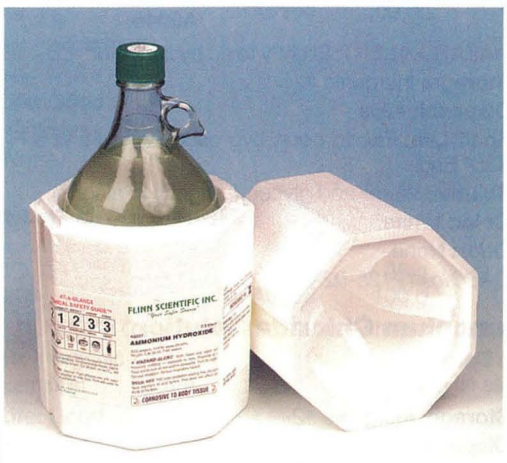
Please order the 2.5 L ammonium hydroxide in the *Plas-Pak*® bottle (A0227). These PVC-coated bottles are lifesavers!

Saf-Cube®

All 14.8 M ammonium hydroxide bottles are shipped in Flinn *Saf-Cubes* for your protection. Don't throw these valuable containers away. They make great storage containers if no acid cabinet is available.

Premixed Solutions

Consider buying Flinn premixed ammonium hydroxide solutions. They save time and are safer to store than concentrated bases. If you make your own solutions…



Always Add Base to Water!

Ammonium Metavanadate

reagent, powder
NH_4VO_3
F.W. 116.99

A0245	10 g	$ 9.15
A0211	25 g	11.95
A0176	100 g	36.35

★ **HAZARD ALERT:** Highly toxic; body tissue irritant; liberates poisonous ammonia gas if heated. LD_{50} 160 mg/kg.
Storage: Inorganic #8
Disposal: #27d
Shelf Life: Indefinite
Soluble: Slightly in cold water.
Color: Light yellow
Odor: None
CAS No. 7803-55-6



Ammonium Molybdate

ammonium molybdate (VI) tetrahydrate
crystal
$(NH_4)_6Mo_7O_{24} \bullet 4H_2O$
F.W. 1235.86

Reagent	A0251	10 g	$ 6.25
	A0228	25 g	11.85
	A0054	100 g	18.40
Laboratory grade	A0306	100 g	$11.90

★ **HAZARD ALERT:** Skin and eye irritant; moderately toxic by ingestion. LD_{50} 333 mg/kg.
Storage: Inorganic #8
Disposal: #6
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 12027-67-7





See page 37 for a detailed explanation of the Flinn Hazard and Usefulness Code.

Ammonium Nickel (II) Sulfate

see Nickel(ous) Ammonium Sulfate

Ammonium Nitrate

pearls
NH_4NO_3
F.W. 80.04

Reagent	A0241	100 g	$ 5.45
	A0055	500 g	11.45
	A0229	2 kg	39.70
Laboratory grade	A0056	500 g	$ 7.95
	A0057	2 kg	25.10

★ **HAZARD ALERT:** Strong oxidizer; may explode if heated under confinement; will explode at temperatures of 210 °C; explodes more readily if contaminated with combustible material; slightly toxic by ingestion; body tissue irritant. LD_{50} 2217 mg/kg.
Storage: Inorganic #8 away from all combustibles. We recommend that this dangerous substance be kept in a Flinn *Saf-Stor*® Can.
Disposal: #26b
Shelf Life: Good if stored safely.
Soluble: Water, alcohol and alkalies.
Color: White
Odor: None
CAS No. 6484-52-2



Safety Purchase Suggestion: Do not store large quantities.
Incompatibility: Acids, chlorates, combustible materials, flammable liquids, nitrites, sulfur, carbon, organic compounds and metals (especially finely divided metals).

Ammonium Nitrate, Gramolpak

0.1 Molar
(as NH_4NO_3) * A0290 pkg. $4.40

For hazard alert, storage, disposal, etc., see Ammonium Nitrate, A0241.
*Gramolpak® is a unique package which makes 1 liter with distilled water.





Ammonium Nitrate Solution

0.5 Molar
(as NH_4NO_3) A0197 500 mL $5.90

★ **HAZARD ALERT:** Toxic by ingestion.
Storage: Inorganic #8
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



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Ammonium Oxalate

laboratory grade, crystal
$(NH_4)_2C_2O_4 \bullet H_2O$
F.W. 142.11

A0243	25 g	$ 5.10
A0058	100 g	12.93
A0230	500 g	32.33

★ **HAZARD ALERT:** Moderately toxic by ingestion and inhalation; corrosive to body tissue.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: White
Odor: None
CAS No. 6009-70-7



Ammonium Oxalate, Gramolpak

0.25 Molar
(as $(NH_4)_2C_2O_4 \bullet H_2O$) * A0291 pkg. $5.25

For hazard alert, storage, disposal, etc., see Ammonium Oxalate, A0243.
*Gramolpak® is a unique package which makes 1 liter with distilled water.





Ammonium Oxalate Solution

0.25 Molar
(as $(NH_4)_2C_2O_4 \bullet H_2O$) A0198 500 mL $6.95

For hazard alert, storage, etc., see Ammonium Oxalate, A0243.
Disposal: #26b
Color: Colorless
Odor: None



A Strong Base and the Human Eye

A strong base like ammonium hydroxide is capable of very, very rapid and extensive eye damage. In fact, tissue damage to the human eye may occur in just the first 30 seconds of exposure. The use of chemical splash goggles and prompt access to a functional eyewash are essential when ammonium hydroxide and other strong bases are used. If chemicals are to be used, chemical splash goggles must be worn!

Ammonium Peroxydisulfate

see Ammonium Persulfate

Ammonium Persulfate

reagent, crystal	A0270	25 g	$ 4.05
$(NH_4)_2S_2O_8$	A0165	100 g	6.61
F.W. 228.21	A0059	500 g	16.41

★ **HAZARD ALERT:** Oxidizer; fire risk in contact with organic substances. Corrosive; moderately toxic. LD_{50} 689 mg/kg.

Storage: Inorganic #6
Disposal: #12a
Shelf Life: Indefinite
Soluble: Water
Color: White
Odor: None
CAS No. 7727-54-0



Ammonium Persulfate, Gramolpak

0.1 Molar

(as $(NH_4)_2S_2O_8$)	* A0292	pkg.	$4.35

For hazard alert, storage, disposal, etc., see Ammonium Persulfate, A0270.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Ammonium Persulfate Solution

0.1 Molar

(as $(NH_4)_2S_2O_8$)	A0282	500 mL	$6.20

Storage: Inorganic #6
Disposal: #12a
Shelf Life: Indefinite
Color: Colorless
Odor: None





Ammonium Phosphate, Monobasic

ammonium dihydrogen phosphate
crystal
$NH_4H_2PO_4$
F.W.115.03

Reagent	A0271	25 g	$ 5.95
	A0166	100 g	17.30
Laboratory grade	A0272	100 g	$ 6.50
	A0060	500 g	17.50

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Slightly in water
Color: White
Odor: None
CAS No. 7722-76-1



Chemicals and Safety Realism

The nation is being swept by CHEMOPHOBIA—the fear of chemicals. Such fears have led to the banning of many chemicals, including such common substances as ammonium nitrate. Ammonium nitrate is probably the most widely used fertilizer in the world. Help educate those who can benefit from more knowledge about chemicals and less fear. Let's be realistic, not fearful.

Ammonium Phosphate, Dibasic

ammonium hydrogen phosphate
reagent grade, crystal
$(NH_4)_2HPO_4$
F.W. 132.06

	A0167	100 g	$ 8.15
	A0061	500 g	17.15

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 7783-28-0



Ammonium Sulfate

crystal
$(NH_4)_2SO_4$
F.W. 132.15

Reagent	A0274	100 g	$ 4.65
	A0062	500 g	10.00
Laboratory grade	A0168	500 g	$ 6.75
	A0144	2 kg	21.80

★ **HAZARD ALERT:** Slightly toxic by ingestion. LD_{50} 2840 mg/kg.

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; not alcohol or acetone.
Color: White
Odor: None
CAS No. 7783-20-2



Ammonium Sulfide

reagent

Light solution	A0063	100 mL	$14.43
	A0064	500 mL	32.33

★ **HAZARD ALERT:** Contact with acids or acid fumes may liberate flammable and poisonous hydrogen sulfide gas. Strong skin and mucous membrane irritant;toxic by skin absorption; vapor harmful. Even low concentrations may cause headache and general discomfort.

Storage: Inorganic #5; keep tightly closed; yellow color intensifies as substance ages.
Disposal: #23
Shelf Life: Good if stored safely; store in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can.
Soluble: Water, alcohol and alkalies.
Color: Yellow/Red
Odor: Rotten eggs
CAS No. 12135-76-1 as ammonium sulfide



Technical Note: The true sulfide form is only stable at a very low temperature, i.e., 0 °C and in the absence of water. The light solution (so-called "yellow") contains approximately 20% $(NH_4)_2S$ or 8% sulfur and 8% ammonia and is the common commercial solution.

Ammonium Tartrate

L-tartaric acid, diammonium salt
reagent, powder
$(NH_4)_2C_4H_4O_6$
F.W. 184.16

	A0212	25 g	$11.95

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Decomposes when exposed to elevated temperatures.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 3164-29-2



Ammonium Thiocyanate

crystal
NH_4SCN
F.W. 76.13

Reagent	**A0065**	100 g	**$ 9.65**
	A0066	500 g	**26.55**
Laboratory grade	**A0213**	100 g	**$ 6.50**
	A0148	500 g	**10.85**

★ **HAZARD ALERT:** Moderately toxic by ingestion. LD_{50} 750 mg/kg.
Storage: Inorganic #7
Disposal: #26a
Shelf Life: Poor; deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, alcohol, acetone and ammonia.
Color: White
Odor: None
CAS No. 1762-95-4
Incompatibility: Dangerous when heated to decomposition (170 °C) or in contact with acids—fumes containing toxic HCN may be produced.



Ammonium Thiocyanate, Gramolpak

0.1 Molar
(as NH_4SCN) *** A0294** pkg. **$5.85**

For hazard alert, storage, disposal, etc., see Ammonium Thiocyanate, A0065.
*Gramolpak® is a unique package which makes 1 liter with distilled water.



Ammonium Vanadate

see Ammonium Metavanadate

Amyl Acetate

pentyl acetate, banana oil
laboratory grade
$CH_3CO_2(CH_2)_4CH_3$
F.W. 130.19

A0214	100 mL	**$ 9.35**
A0109	500 mL	**23.20**

★ **HAZARD ALERT:** Dangerous fire risk; flammable.
Storage: Organic #3 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Good if stored safely.
Soluble: Water and alcohol
Color: Colorless
Odor: Banana-like
CAS No. 628-63-7
Incompatibility: Reacts vigorously with reducing agents.



Isoamyl Alcohol

see Isopentyl Alcohol

n-Amyl Alcohol

1-pentanol
reagent
$CH_3(CH_2)_4OH$
F.W. 88.15

A0182	100 mL	**$ 8.01**
A0067	500 mL	**13.51**

★ **HAZARD ALERT:** Moderate fire risk; slightly toxic by ingestion and inhalation; severe body tissue irritant. LD_{50} 2200 mg/kg.
Storage: Organic #2 in a dedicated flammables cabinet; if one is not available store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Good, if stored properly.
Soluble: Alcohol
Color: Colorless
Odor: Banana-like
CAS No. 71-41-0
Incompatibility: Can react vigorously with oxidizing agents.



Amylase

enzyme, powder obtained from B. subtilis

A0302	5 g	**$ 9.55**
A0283	10 g	**14.00**
A0303	25 g	**28.65**

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Tan
Odor: Malty



Aniline

aminobenzene
reagent
$C_6H_5NH_2$
F.W. 93.13

A0169 100 mL **$11.53**

★ **HAZARD ALERT:** *Confirmed animal carcinogen* with unknown relevance to humans. Highly toxic by ingestion, inhalation and skin absorption. Severe eye irritant and mild sensitizer. Combustible. LD_{50} 250 mg/kg. TLV 7.6 mg/m^3.
Storage: Organic #2 in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can.
Disposal: #5
Shelf Life: Stores poorly; darkens on exposure to light and air.
Soluble: Water, alcohol, ether and benzene.
Color: Colorless to brown, oily liquid
Odor: Hard to characterize. A very slight benzene-like odor.
CAS No. 62-53-3
Incompatibility: Oxidizing agents; particularly hydrogen peroxide and nitric acid.
Safety Purchase Suggestion: Avoid purchasing this item unless you expect to practice strict hygiene.



Aniline Blue

biological stain/indicator
pH 10 blue to 13 orange **A0091** 10 g **$25.00**

★ **HAZARD ALERT:** Body tissue irritant.
Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Purple/black
Odor: None
CAS No. 28631-66-5
C.I. #42755



Aniline Blue Staining Solution

1%, aqueous

A0246 100 mL **$7.15**
(Packaged in PVC-coated bottles)

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Purple/black
Odor: None



How Toxic Is Toxic?

Quantitative standards have been established for hundreds of common substances. These standards enable users to know exactly how much exposure may be considered safe. Toxic materials may enter the body by way of skin contact, inhalation or ingestion. Discover more about these important matters by reviewing the articles on TLV (pages 928–929) and toxicity (pages 930–931) in your *Flinn Scientific Catalog/Reference Manual*.

Aniline Hydrochloride

laboratory grade, crystal
$C_6H_5NH_2 \cdot HCl$ **A0170** 25 g **$12.95**
F.W. 129.60

★ **HAZARD ALERT:** Moderately toxic by ingestion, inhalation, and skin absorption. Particularly dangerous to eyes; causes intense eye irritation. LD_{50} 840 mg/kg.

Storage: Organic #2 in a Flinn *Chem-Saf*® Bag.
Disposal: #5
Shelf Life: Stores poorly.
Soluble: Water, alcohol and ether.
Color: White
Odor: None
CAS No. 142-04-1



Incompatibility: Oxidizing agents; particularly hydrogen peroxide and nitric acid.

Anthranilic Acid

o-aminobenzoic acid
reagent, powder
$H_2NC_6H_4COOH$ **A0304** 25 g **$12.25**
F.W. 137.13

★ **HAZARD ALERT:** Mild body tissue irritant.

Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Soluble in alcohol; slightly in water.
Color: Off-white to pale yellow
Odor: Sweet
CAS No. 118-92-3



Technical Note: Use to prepare methyl anthranilate, a grape-scented ester.

Anti-bump Granules

see Boiling Stones

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Antimony

Sb
A.W. 121.75

Powder	**A0199**	25 g	**$ 8.10**
50 mesh or finer	**A0071**	100 g	**19.40**
Lump	**A0275**	25 g	**$ 7.35**
	A0110	100 g	**12.65**

Storage: Inorganic #1
Disposal: #27d
Shelf Life: Indefinite
Soluble: Insoluble in water
Color: Gray
Odor: None
CAS No. 7440-36-0



Incompatibility: The poison gas stibine is formed by the action of acidic reducing agents on antimony and its compounds.

What Does Highly Toxic Mean?

Flinn Scientific uses a toxicity standard similar to the *Prudent Practices in the Laboratory* standard. Highly toxic materials have an Oral-Rat LD_{50} of 0–250 mg/kg or an Inhalation-Rat LC_{50} of 0–220 ppm/hr. For a 50-kg person (about 110 lbs), 50 mg/kg translates into one-half teaspoon of chemical; 250 mg/kg is about 2.5 teaspoons. Highly toxic materials require special attention and should always be kept under lock and key in a poison cabinet.

Antimony Potassium Tartrate

potassium antimonyl tartrate
laboratory grade, powder
$(SbKC_4H_2O_6)_2 \cdot 3H_2O$ **A0200** 100 g **$17.45**
F.W. 667.86

★ **HAZARD ALERT:** Toxic by ingestion and inhalation. LD_{50} 115 mg/kg.

Storage: Inorganic #2
Disposal: #27d
Shelf Life: Indefinite
Soluble: Water, glycerol; not alcohol.
Color: White
Odor: None
CAS No. 28300-74-5



Incompatibility: The poison gas stibine is formed by the action of acidic reducing agents on antimony compounds.

Antimony Trichloride

antimony chloride
reagent, crystal **A0216** 10 g **$ 8.40**
$SbCl_3$ **A0074** 25 g **15.90**
F.W. 228.13 **A0075** 100 g **38.20**

★ **HAZARD ALERT:** Corrosive as solid or liquid; strong skin and eye irritant; moderately toxic. LD_{50} 525 mg/kg.

Storage: Inorganic #2
Disposal: #27d
Shelf Life: Poor; very hygroscopic; fumes at room temperature; store in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can.
Soluble: Alcohol, acetone and acids. In water it forms antimony oxychloride.
Color: White/gray
Odor: Slight chlorine
CAS No. 10025-91-9



Incompatibility: The poison gas stibine is formed by the action of acidic reducing agents on antimony compounds.

Antimony Trichloride, Gramolpak

0.1 Molar
(as $SbCl_3$) * **A0295** pkg. **$12.25**

For hazard alert, storage, disposal, etc., see Antimony Trichloride, A0216.

* Dissolve Gramolpak® in 200 mL of concentrated hydrochloric acid (Flinn No. H0004); dilute to 1 liter with distilled water. Always add acid to water.





Antimony Trichloride Solution

0.1 Molar
(as $SbCl_3$) **A0284** 100 mL **$10.40**

★ **HAZARD ALERT:** Corrosive; moderately toxic by ingestion.

Storage: Inorganic #2
Disposal: #27d
Shelf Life: Indefinite
Color: Colorless
Odor: Slight chlorine



Arabic, Gum

see Acacia

D-Arabinose

pectin sugar
$C_5H_{10}O_5$ **A0154** 25 g **$39.60**
F.W. 150.13

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and glycerol; not in alcohol or ether.
Color: White
Odor: None
CAS No. 28697-53-2



L-Arabinose

pectin sugar
$C_5H_{10}O_5$
F.W. 150.13

A0301 25 g $53.70

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and glycerol; not in alcohol or ether.
Color: White
Odor: None
CAS No. 87-72-9



L-Arginine



amino acid, free base
laboratory grade, crystal
$C_6H_{14}N_4O_2$
F.W. 174.20

A0308 5 g $10.75

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; slightly in hot alcohol.
Color: White
Odor: None
CAS No. 74-79-3



Arsenic Trioxide

arsenic(III) oxide
reagent, powder
As_2O_3
F.W. 197.84

A0171 25 g $21.15

★ **HAZARD ALERT:** *A known carcinogen;* highly toxic by ingestion and inhalation. Use only under a fume hood. LD_{50} 15.1 mg/kg. TLV 0.2 mg/m^3 as arsenic.
Storage: Inorganic #7 in a Flinn *Chem-Saf*® Bag inside a Flinn *Saf-Stor*® Can. Store in a poison cabinet.
Disposal: #27d
Shelf Life: Good if stored safely.
Soluble: Acids and alkalis; slightly in water.
Color: White
Odor: None
CAS No. 1327-53-3



Safety Purchase Suggestion: Avoid the use of this item in a school science department unless you expect to practice strict hygiene.

Arsenious Acid

see Arsenic Trioxide

L-Ascorbic Acid

vitamin C
reagent, powder
$C_6H_8O_6$
F.W. 176.13

A0077 25 g $ 5.80
A0078 100 g 10.55

Storage: Organic #1
Disposal: #26a
Shelf Life: Good if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 134-03-2



L-Asparagine

amino acid
crystal, monohydrate
$C_4H_8N_2O_3 \cdot H_2O$
F.W. 150.14

A0218 25 g $15.80

Storage: Organic #1

Continued on next column.

L-ASPARAGINE *continued*

Disposal: #26a
Shelf Life: Indefinite
Soluble: Acids and alkalies; not soluble in most organic solvents.
Color: White
Odor: None
CAS No. 5794-13-8



L-Aspartic Acid

amino acid
laboratory grade, crystal
$C_4H_7NO_4$
F.W. 133.10

A0120 100 g $19.85

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 56-84-8



Aspirin, Tablets

acetylsalicylic acid

A0201 bottle 100 tablets $8.35

★ **HAZARD ALERT:** An allergen; may cause bleeding after ingestion; 10-gram dose may be fatal.
Storage: Organic #1
Disposal: #26a
Shelf Life: Poor unless stored under cool, dry conditions.
Color: White
Odor: Slight vinegar
Safety Note: Not sold for human consumption.
Technical Note: See also acetylsalicylic acid.



ATP

see Adenosine Triphosphate Disodium Salt

Aurin Tricarboxylic Acid

aluminon, triammonium salt
reagent for determination of aluminum
$C_{22}H_{23}N_3O_9$
F.W. 473.44

A0079 5 g $15.45

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Red/brown
Odor: None
CAS No. 569-58-4



Technical Note: Prepare 0.1% solution for qualitative determination of aluminum.

Azure B

Methylene Blue contains a small amount of Azure B stain and can be substituted for many Azure B staining procedures.

Mystery Substances

Virtually every teacher will encounter an "unknown" on his/her shelf. The answer to the question "What is it?" is found in the Flinn Mystery Substance Identification Procedure. For a free copy, send your request to Flinn Scientific, Inc., P.O. Box 219, Batavia, IL 60510.

B

Bacteriological Media

see table of culture media, page 79, and individual catalog listings

Baking Powder

Typical composition: sodium aluminum sulfate, calcium sulfate, calcium phosphate and cornstarch

B0001	175 g	$2.85

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Good if kept dry; store in Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: White
Odor: None
Safety Note: Not for human consumption.



Baking Soda

see Sodium Bicarbonate

Balsam

Canada
clear, neutral solution in xylene

B0152	10 mL	$10.50
B0002	25 mL	14.85

★ **HAZARD ALERT:** Balsam dissolved in xylene; xylene is a moderate fire risk; slightly toxic by ingestion and inhalation.
Storage: Organic #3 in a flammables cabinet.
Disposal: #18b
Shelf Life: Good if stored safely; store in a dedicated flammables cabinet; if one is not available use a Flinn *Saf-Stor*® Can.
Color: Yellow
Odor: Sweet; cedar-like



Barfoed's Reagent

test for glucose
contains: cupric acetate, acetic acid and water

B0061	100 mL	$7.15

★ **HAZARD ALERT:** Cupric acetate is moderately toxic.
Storage: Inorganic #2
Disposal: #24a
Shelf Life: Indefinite
Color: Light blue/green
Odor: Faint vinegar



Barium Acetate

reagent grade, crystal
$(CH_3CO_2)_2Ba \bullet H_2O$
F.W. 273.43

B0125	100 g	$11.23

★ **HAZARD ALERT:** Moderately toxic by ingestion and inhalation. LD_{50} 921 mg/kg.

Continued on next column.

Prevent Chemical Contamination

Stop one student's carelessness from ruining an experiment for the rest of your class. Prevent contamination of chemical stock bottles by:

1. Never allowing student access to stock bottles.
2. Never returning unused chemicals to stock bottles.

Pure chemicals help yield accurate results.

BARIUM ACETATE *continued*

Storage: Inorganic #2
Disposal: #27h
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 543-80-6



Barium Carbonate

powder
$BaCO_3$
F.W. 197.37

Reagent	B0126	25 g	$10.45
	B0056	100 g	19.65
Laboratory grade	B0071	500 g	$10.35

★ **HAZARD ALERT:** Moderately toxic by ingestion; strong body tissue irritant. LD_{50} 418 mg/kg.
Storage: Inorganic #4
Disposal: #27h
Shelf Life: Indefinite
Soluble: Acids; except sulfuric acid.
Color: White
Odor: None
CAS No. 513-77-9



Barium Chloride

crystal
$BaCl_2 \bullet 2H_2O$
F.W. 244.28

Reagent	B0004	100 g	$ 6.33
	B0005	500 g	14.63
	B0169	2 kg	48.03
Laboratory grade	B0170	100 g	$ 4.13
	B0006	500 g	7.33
	B0007	2 kg	26.93

★ **HAZARD ALERT:** Highly toxic by ingestion; 0.8 gram may be fatal; store in a Flinn *Chem-Saf*® Bag. LD_{50} 118 mg/kg.
Storage: Inorganic #2
Disposal: #27h
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 10326-27-9
Safety Purchase Suggestion: Buy and store only small quantities packaged in an unbreakable container.



Barium Chloride, Gramolpak

0.1 Molar
(as $BaCl_2 \bullet 2H_2O$) * B0205 pkg. $4.60

For hazard alert, storage, disposal, etc., see Barium Chloride, B0004.
*Gramolpak® is a unique package which makes 1 liter with distilled water.





Barium Chloride Solution

(as $BaCl_2 \bullet 2H_2O$)

1 Molar*	B0143	500 mL	$8.70
0.1 Molar†	B0144	500 mL	8.70

★ **HAZARD ALERT:** Toxic by ingestion.
Storage: Inorganic #2
Disposal: #27h
Shelf Life: Indefinite
Color: Colorless
Odor: None





Barium Dioxide

see Barium Peroxide

Barium Hydroxide

large crystal
$Ba(OH)_2 \cdot 8H_2O$
F.W. 315.50

Reagent	**B0009**	100 g	**$ 9.23**
	B0174	500 g	**22.03**
Laboratory grade	**B0155**	100 g	**$ 6.73**
	B0072	500 g	**13.93**

★ **HAZARD ALERT:** Toxic by ingestion.
Storage: Inorganic #4
Disposal: #27h
Shelf Life: Poor; absorbs carbon dioxide from the air; keep tightly closed in a Flinn *Chem-Saf*® Bag.
Soluble: Water, alcohol and ether.
Color: White
Odor: None
CAS No. 12230-71-6



Barium Hydroxide, Gramolpak

0.1 Molar
(as $Ba(OH)_2 \cdot 8H_2O$) *** B0206** pkg. **$6.80**

For hazard alert, storage, disposal, etc., see Barium Hydroxide, B0009.
*Gramolpak® is a unique package which makes 1 liter with distilled water.



Barium Hydroxide Solution

0.1 Molar
(as $Ba(OH)_2 \cdot 8H_2O$) **B0146** 500 mL **$5.30**

★ **HAZARD ALERT:** Toxic by ingestion.
Storage: Inorganic #4
Disposal: #27h
Shelf Life: Poor—unless kept tightly closed.
Color: Colorless
Odor: None





Barium Nitrate

crystal
$Ba(NO_3)_2$
F.W. 261.35

Reagent	**B0199**	25 g	**$ 4.35**
	B0010	100 g	**6.43**
	B0011	500 g	**17.53**
Laboratory grade	**B0232**	500 g	**$10.93**

★ **HAZARD ALERT:** Strong oxidizer; potentially serious fire risk; moderately toxic by ingestion. LD_{50} 355 mg/kg.
Storage: Inorganic #3
Disposal: #27h
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 10022-31-8



Barium Nitrate, Gramolpak

0.1 Molar
(as $Ba(NO_3)_2$) *** B0207** pkg. **$6.75**

For hazard alert, storage, disposal, etc., see Barium Nitrate, B0199.
*Gramolpak® is a unique package which makes 1 liter with distilled water.

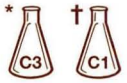


Barium Nitrate Solution

(as $Ba(NO_3)_2$)

Saturated*	**B0147**	500 mL	**$7.65**
approx. 0.3 molar Ideal for flame tests			
0.1 Molar†	**B0148**	500 mL	**5.30**

★ **HAZARD ALERT:** Toxic by ingestion.
Storage: Inorganic #3
Disposal: #27h
Shelf Life: Indefinite
Color: Colorless
Odor: None



Barium Peroxide

anhydrous
reagent, powder
BaO_2
F.W. 169.34

	B0153	25 g	**$ 8.70**
	B0058	100 g	**19.13**

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Toxic by ingestion; oxidizer; fire and explosion risk in contact with organic material. Skin irritant. Corrosive, causes burns.
Storage: Inorganic #6 in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can.
Disposal: #27h
Shelf Life: Poor unless kept cool and dry.
Soluble: Slightly in water.
Color: Tan, off-white
Odor: None
CAS No. 1304-29-6



Incompatibility: Dangerous if mixed with reducing agents, acetic acid, metal powders or organics.
Safety Purchase Suggestion: Buy only small quantity and store as suggested above.

Barium Sulfate

powder
$BaSO_4$
F.W. 233.43

Reagent	**B0154**	25 g	**$ 6.85**
	B0073	100 g	**14.70**
Laboratory grade	**B0198**	100 g	**$ 5.35**
	B0059	500 g	**11.20**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Concentrated sulfuric acid.
Color: White
Odor: None
CAS No. 7727-43-7



Basic Fuchsin

see Fuchsin, Basic

Odor and Chemical Literacy

Understanding the properties of chemicals, including their odors, is an important part of chemistry. Students should be *safely* exposed to odors like a sulfide (and lots of others) as part of their education. It can be done safely! Don't allow unrealistic safety rules to create incompletely trained chemistry students.

Beef Extract

	B0127	25 g	$12.35
	B0037	100 g	37.65

Storage: Miscellaneous non-hazardous organic material.
Disposal: #26a
Shelf Life: Poor unless kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: Brown/black
Odor: Putrid beef
Safety Note: Not for human consumption.



Beeswax

granulated beads, laboratory grade

White	B0012	100 g	$ 9.90
	B0013	500 g	20.65
Yellow	B0128	100 g	$10.20
	B0014	500 g	23.80

Storage: Organic #3
Disposal: #26a
Shelf Life: Indefinite
Soluble: Most organic solvents; not water.
Color: White/yellow
Odor: None
CAS No. 8012-89-3



Technical Note: White beeswax is bleached and yellow is natural.

Benedict's Qualitative Reagent Powder

contains: sodium citrate, sodium carbonate and copper (II) sulfate

	*B0049	pkg.	$15.20

★ **HAZARD ALERT:** Moderately toxic; skin and eye irritant.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Excellent
Soluble: Water
Color: White
Odor: None



*Sufficient to make 1 liter with distilled water.

Benedict's Qualitative Solution

for analysis of reducing sugars
Contains: sodium citrate, sodium carbonate and copper (II) sulfate

	B0171	100 mL	$ 3.10
	B0015	500 mL	4.60
	B0016	1 liter	6.50
	B0172	4 liters	19.70

★ **HAZARD ALERT:** Skin and eye irritant.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Light blue
Odor: None



Who Designed This Laboratory?

We hear this phrase often from teachers moving into new or remodeled labs. Architects don't always understand the safety, space, and ventilation requirements of a modern high school science lab. Let Flinn help you take an active role in the design of your labs. See our Chemistry Laboratory Design article on pages 938–939, then call us for a free copy of our Flinn Laboratory Design Packet.

Benedict's Quantitative Solution

for quantitative sugar determinations
Contains: sodium citrate, sodium carbonate, copper (II) sulfate, potassium thiocyanate, and potassium ferrocyanide

	B0195	100 mL	$4.90
	B0062	500 mL	9.95

★ **HAZARD ALERT:** Moderately toxic; skin and eye irritant.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Light blue
Odor: None



Benzaldehyde

laboratory grade
C_6H_5CHO
F.W. 106.13

	B0196	25 mL	$ 6.70
	B0017	100 mL	13.11

★ **HAZARD ALERT:** Reacts with strong oxidizers; slightly toxic by inhalation or ingestion; irritating vapor; combustible. LD_{50} 1300 mg/kg.
Storage: Organic #3
Disposal: #2
Shelf Life: Fair; oxidizes to benzoic acid; yellows on prolonged storage; protect from light; keep tightly closed in Flinn *Chem-Saf*® Bag.
Soluble: Miscible with alcohol, ether and some volatile oils; slightly soluble in water.
Color: Colorless
Odor: Almond
CAS No. 100-52-7



Incompatibility: Potassium permanganate, sodium peroxide and other oxidizing agents.

Benzene

reagent
C_6H_6
F.W. 78.11

	B0129	100 mL	$ 8.51
	B0018	500 mL	17.81

★ **HAZARD ALERT:** *Known carcinogen;* strict observance of safety precautions must be practiced, i.e., use a hood; wear gloves; use eye or face protection. Flammable; dangerous fire risk; moderately toxic by ingestion, inhalation and skin absorption. LD_{50} 930 mg/kg. TLV 32 mg/m^3.
Storage: Organic #3 in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can. Benzene, if packaged in glass, must be protected against possible breakage.
Disposal: #18b
Shelf Life: Good if stored safely.
Soluble: Miscible with alcohol, ether, acetone, carbon tetrachloride, carbon disulfide and acetic acid. Slightly soluble in water.
Color: Colorless
Odor: Gasoline-like
CAS No. 71-43-2



Incompatibility: Dangerous in contact with chlorine or oxidizing agents.
Technical Note: Avoid buying and storing this *known carcinogen* unless you employ strict hygiene practices. Consider substituting cyclohexane, toluene or xylenes.

Benzin

see Petroleum Ether

Benzoic Acid

laboratory grade, flake
C_6H_5COOH
F.W. 122.12

	B0197	100 g	$10.00
	B0020	500 g	12.55

★ **HAZARD ALERT:** Slightly toxic by ingestion; body tissue irritant; combustible. LD_{50} 1700 mg/kg.

BENZOIC ACID continued on next page.

BENZOIC ACID *continued*

Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Alcohol, ether, chloroform, carbon disulfide and carbon tetrachloride. Only slightly soluble in water.
Color: White
Odor: Maple syrup
CAS No. 65-85-0



Benzoic Acid, Sodium Salt

see Sodium Benzoate

Benzoin

laboratory grade, fine crystal
$C_6H_5CH(OH)COC_6H_5$ **B0075** 10 g **$10.95**
F.W. 212.25

Storage: Organic #3
Disposal: #2
Shelf Life: Indefinite
Soluble: Acetone; hot alcohol; slightly in water.
Color: Light yellow
Odor: Benzaldehyde; almond-like.
CAS No. 579-44-2



Benzol

see Benzene

CONTACT US VIA E-MAIL
flinn@flinnsci.com

Benzophenone

diphenyl ketone
laboratory grade, large crystal

$(C_6H_5)_2CO$	**B0194**	10 g	**$ 7.15**
F.W. 182.22	**B0156**	25 g	**7.90**
	B0226	100 g	**18.30**

Storage: Organic #4
Disposal: #18b
Shelf Life: Good
Soluble: Chloroform; partially in alcohol; insoluble in water.
Color: Waxy white
Odor: Sweet, rose-like
CAS No. 119-61-9



Benzoyl Peroxide

dibenzoyl peroxide
laboratory grade, granular

$(C_6H_5CO)_2O_2$	**B0158**	25 g	**$10.50**
F.W. 242.23	**B0131**	100 g	**36.11**

★ **HAZARD ALERT:** Both flammable and explosive; may explode spontaneously upon heating or friction or when dry (less than 1% water); reacts **violently** with strong bases; irritates eyes, skin and respiratory tract. LD_{50} 7710 mg/kg. TLV 5 mg/m^3.
Storage: Organic #6 in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can.
Disposal: #22b
Shelf Life: Poor; plan not to store an item like this.
Soluble: Most organic solvents; slightly in water.
Color: Gray/white
Odor: Faint almond
CAS No. 94-36-0



Safety Purchase Suggestion: Avoid this item on school premises. A slightly safer alternative substance would be lauroyl peroxide when used as a polymer catalyst.

Benzyl Alcohol

$C_6H_5CH_2OH$	**B0132**	100 mL	**$ 9.80**
F.W. 108.14	**B0069**	500 mL	**25.95**

★ **HAZARD ALERT:** Reacts **violently** with strong oxidants; body tissue irritant; slightly toxic by ingestion and inhalation; combustible; may form explosive peroxides on concentration. LD_{50} 1230 mg/kg.
Storage: Organic #2 inside a Flinn *Chem-Saf*® Can.
Disposal: #18b
Shelf Life: Good if stored safely and away from oxidants.
Soluble: Miscible with alcohol, ether and chloroform; slightly soluble in water.
Color: Colorless
Odor: Slight floral
CAS No. 100-51-6



6-Benzylaminopurine

6-benzyladenine, a cytokinin
laboratory grade

$C_{12}H_{11}N_5$	**B0214**	1 g	**$28.10**
F.W. 225.26			

Storage: Organic #2
Disposal: #5
Shelf Life: Indefinite
Soluble: Insoluble in water.
Color: White
Odor: None
CAS No. 1214-39-7



Technical Note: Use a 0.1–5.0 mg/L solution as a plant growth regulator.

BHT

see 2,6-Di-t-Butyl-4-Methylphenol on page 84

Bial's Reagent

Sumner reagent
test for pentose and glycuronic acid

Preparation Instructions: Solution must be freshly prepared. Dissolve 6 grams of resorcinol (Flinn No. R0015) in 200 mL of 95% ethyl alcohol (Flinn No. E0009); add 40 drops of a 10% ferric chloride solution (Flinn No. F0045).
Storage: Organic #2 in a dedicated flammables cabinet or if one is not available, in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Indefinite

Bile Salts

sodium salts of glycocholic and taurocholic acids
powder

	B0186	10 g	**$ 4.55**
	B0133	25 g	**7.65**
	B0038	100 g	**17.40**

Storage: Organic #1
Disposal: #26a
Shelf Life: Good, but only if kept dry.
Soluble: Water and alcohol
Color: Yellow/brown
Odor: Putrid beef



How Is Your Housekeeping?

OSHA standards state "all places of employment, passageways, storerooms, and service rooms shall be kept clear and orderly and in sanitary condition." Common sense says good housekeeping is an attitude and the cornerstone of any good safety program. Safety inspectors check housecleaning practices first. A clean lab is a safer lab.

Bile Salts Solution

5%, aqueous B0160 100 mL $4.15

Storage: Organic #1
Disposal: #26b
Shelf Life: Fair; may deteriorate if stored for long period at elevated temperatures.
Color: Yellow/brown
Odor: None



Bismark Brown Y

basic brown 1, biological stain

B0161 10 g $17.65
(Packaged in PVC-coated bottles)

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; insoluble in common organic solvents.
Color: Deep burgundy
Odor: None
CAS No. 10114-58-6
C.I. #21000



Bismuth

Bi
A.W. 208.98

Lump	B0192	25 g	$ 7.50
	B0048	100 g	12.80
Granular	B0193	25 g	$ 7.25
	B0142	100 g	17.45

★ **HAZARD ALERT:** Flammable in finely divided form such as dust. Slightly toxic by inhalation or ingestion. LD_{50} 5000 mg/kg.
Storage: Inorganic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Nitric and hydrochloric acid
Color: Metallic silver
Odor: None
CAS No. 7440-69-9



Bismuth(III) Chloride

see Bismuth Trichloride

Bismuth Nitrate

laboratory grade, crystal
$Bi(NO_3)_3 \cdot 5H_2O$ B0162 5 g $ 7.90
F.W. 485.10 B0140 10 g 10.85
B0022 25 g 20.75

★ **HAZARD ALERT:** Oxidizer; fire risk near organic material; slightly toxic. LD_{50} 4042 mg/kg.
Storage: Inorganic #3
Disposal: #26a
Shelf Life: Fair to poor; hygroscopic; store in a Flinn *Chem-Saf*® Bag.
Soluble: Dilute nitric acid, alcohol and acetone; slowly decomposed by water.
Color: White
Odor: Stinging; acid-like
CAS No. 10035-06-0



Less Is Better

Flinn has made an effort to provide smaller package sizes of chemicals where appropriate. Our motivation is simple: reduce the amount of hazardous chemicals in your storeroom, allow you to keep fresher chemicals on hand, and reduce the amount of chemicals that will require disposal. Certainly, small packages of chemicals are more expensive but the overall cost is less when you view it from a safety and disposal perspective.

Bismuth Nitrate Solution

0.1 Molar
(as $Bi(NO_3)_3 \cdot 5H_2O$) B0202 100 mL $16.65

★ **HAZARD ALERT:** Corrosive, contains nitric acid.
Storage: Inorganic #3
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: Slight nitric acid





Bismuth Trichloride

bismuth(III) chloride
laboratory grade, large crystal

$BiCl_3$	B0213	5 g	$11.45
F.W. 315.34	B0134	10 g	15.10
	B0023	25 g	22.90

★ **HAZARD ALERT:** Corrosive dust, avoid inhalation; slightly toxic. LD_{50} 3334 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; very deliquescent; heating will make substance volatile; store in a Flinn *Chem-Saf*® Bag.
Soluble: Acids; not alcohol; decomposes in water.
Color: White
Odor: None
CAS No. 7787-60-2



Bismuth Trichloride, Gramolpak

0.1 Molar
(as $BiCl_3$) * B0209 pkg. $10.00

For hazard alert, disposal, etc., see Bismuth Trichloride, B0213.

* Dissolve Gramolpak® in 20 mL of concentrated hydrochloric acid (Flinn No. H0004); dilute to 100 mL with distilled water. Always add acid to water.



Bismuth Trichloride Solution

0.2 Molar
(as $BiCl_3$) B0203 100 mL $15.00

★ **HAZARD ALERT:** Corrosive, contains hydrochloric acid.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: None



Biuret

reagent which gives a positive result with biuret test solution
laboratory grade, powder
$NH_2CONHCONH_2$ B0135 50 g $18.45
F.W. 103.09

Storage: Organic #2
Disposal: #18b
Shelf Life: Hygroscopic solid; store in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can.
Soluble: Water and alcohol
Color: White
Odor: Vomit
CAS No. 108-19-0



Technical Note: Biuret is not used to prepare biuret solution. Biuret is used as a reference to indicate a positive result with biuret test solution. See the following listing for biuret test solution.

Biuret Test Solution

Solution changes color from blue to purple in the presence of protein.
Contains: copper sulfate and 15% w/v aqueous sodium hydroxide.

B0050	100 mL	$ 3.90
B0051	500 mL	6.45
B0230	1000 mL	10.80

★ HAZARD ALERT: Corrosive liquid; especially corrosive to eyes. Wear eye protection.
Storage: Inorganic #4 in a Flinn *Chem-Saf*® Bag.
Disposal: #10
Shelf Life: Good
Color: Royal blue
Odor: None



Bleach

see Sodium Hypochlorite Solution

Blood Agar Base Infusion

fine powder
culture media B0191 100 g $34.60

Storage: Miscellaneous organic
Disposal: #26a
Shelf Life: Fair to poor. Keep dry.
Soluble: Water
Color: White/buff
Odor: Putrid beef



Blood Staining Solution

see Wright's Staining Solution

Bluing Solution, Flinn



for growing beautiful salt crystal gardens
B0235 500 mL $5.00

Storage: Miscellaneous inorganic
Disposal: #26b
Shelf Life: Indefinite
Soluble: Suspension in water
Color: Blue
Odor: None



Bluing, Laundry

Mrs. Stewart's B0220 8 oz. $5.80

For hazard alert, storage, disposal, etc., see Bluing Solution, Flinn, B0235.



Boiling Stones

boiling chips B0136 100 g $ 8.95
4 mesh* B0079 250 g 14.05

Storage: Miscellaneous non-hazardous inorganic material.
Disposal: #26a
Color: Gray/white
Odor: None



Technical Note: Prevents bumping. High purity, amphoteric (behaves either as an acid or a base), alundum granules. Hard, porous surface, will not crumble or powder. Resists almost all chemicals except strong alkalies and concentrated sulfuric acid. For test tubes, use 1–2 granules; for flasks, 3–4.
*approximately 7–9 mm

Borax

see Sodium Borate, Tetra

Borax Carmine

histological staining solution
This solution must be freshly prepared before use. See page 956 for preparation instructions.
★ HAZARD ALERT: Slightly toxic.

Continued on next column.

BORAX CARMINE *continued*

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite



Boric Acid

H_3BO_3
F.W. 61.83

Reagent	B0137	100 g	$ 6.40
granular	B0025	500 g	15.85
Laboratory grade	B0201	100 g	$ 5.60
powder	B0081	500 g	8.15

★ HAZARD ALERT: Slightly toxic by ingestion; irritant to skin in dry form. LD_{50} 2660 mg/kg.
Storage: Inorganic #9
Disposal: #24b
Shelf Life: Indefinite
Soluble: Water, alcohol, and glycerol.
Color: White
Odor: None
CAS No. 10043-35-3



Boric Acid, Gramolpak

0.1 Molar
(as H_3BO_3) * B0210 pkg. $4.35

For hazard alert, storage, disposal, etc., see Boric Acid, B0137.
*Gramolpak® is a unique package which makes 1 liter with distilled water.





Bouillon Cubes

culture media ingredient B0190 pkg./15 cubes $3.45

Storage: Miscellaneous non-hazardous organic material.
Disposal: #26a
Shelf Life: Fair; keep dry.
Soluble: Water
Color: Orange/brown
Odor: Beef broth



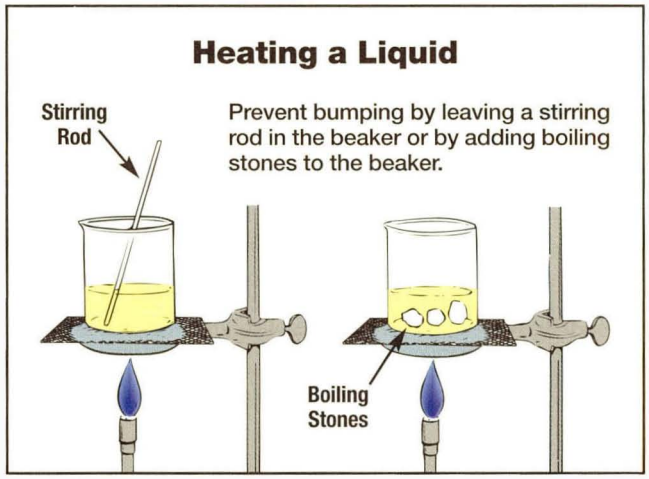
Brass Sheet

each piece 12″ × 12″
#30 gauge B0027 each $28.15
.010″ thick

Storage: Inorganic #1
Disposal: #26a
Shelf Life: Indefinite
Color: Brass
Odor: None



Heating a Liquid



Brass Shot

B0234 100 g $9.35

For storage, disposal, etc., see Brass Sheet, B0026.

D3

Brass Strips

each strip 6″ × ½″ × .025″

B0231 pkg./6 strips $6.75

For storage, disposal, etc., see Brass Sheet, B0026.

D3

Brilliant Cresyl Blue

biological stain, certified B0163 5 g $26.85

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Deep green
Odor: None
CAS No. 81029-05-2
C.I. #51010

D4

Brilliant Cresyl Blue Staining Solution

1% in 0.85% sodium chloride aqueous solution

B0083 100 mL $13.80

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Blue/green
Odor: None

D4

Brilliant Green

basic green 1
biological stain/indicator
pH 0 yellow to 2.6 green

B0164 10 g $15.35

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Gold/green
Odor: None
CAS No. 633-03-4
C.I. #42040

D4

Brilliant Green Indicator Solution

1%, aqueous

*B0188 20 mL $3.60

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Blue/green
Odor: None

D4

*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Chemical Odors

Many chemicals, particularly organic chemicals, have a characteristic odor. Odor information has been added to each of our chemical listings. Practical and brief odor identification terms have been used to keep it simple. Chemical odor and chemical color are unique pieces of information provided only by Flinn Scientific.

Brimstone

see Sulfur, Roll

Bromcresol Green

indicator, sodium salt
pH 3.8 yellow to 5.4 blue
reagent
$C_{21}H_{13}Br_4NaO_5S$ B0039 1 g $11.25
F.W. 720.02 B0040 5 g 21.70

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Light brown
Odor: None
CAS No. 62625-32-5

D3

#1 IN SAFETY

Innovative chemical packaging, informative chemical safety labels and updated easy-to-read MSDS make Flinn Scientific your safest choice for laboratory chemicals!

Bromcresol Green Indicator Solution

0.1%, alcoholic

B0151 100 mL $4.90

★ **HAZARD ALERT:** Flammable liquid. Contains ethyl alcohol; toxic by ingestion.
Storage: Organic #9 in a dedicated flammables cabinet.
Disposal: #26b
Shelf Life: Indefinite
Color: Dark green to blue
Odor: Alcohol-like

C3

Bromcresol Green Indicator Solution

0.04%, aqueous

B0064 100 mL $4.90

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Dark green to blue
Odor: None

D3

Bromcresol Purple

indicator, sodium salt
pH 5.2 yellow to 6.8 purple
fine crystal
$C_{21}H_{15}Br_2O_5SNa$ B0041 1 g $ 8.00
F.W. 562.22 B0042 5 g 20.00

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Black
Odor: None
CAS No. 62625-30-3

D4

Bromcresol Purple Indicator Solution

0.04%, aqueous

B0124 100 mL $5.10

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Orange/red
Odor: None

D4

Bromine

Br_2
F.W. 159.83

B0149 3 × 1-g ampules $13.80

Due to Flinn's unique safety packaging, truck shipment is no longer required. The total volume of bromine in these ampules is about 1 mL.

★ **HAZARD ALERT:** Highly toxic by inhalation and ingestion; severe skin irritant; very strong oxidizer; reacts violently with many organic compounds; very hazardous substance even in this small ampule. TLV 0.66 mg/m^3.

Storage: Inorganic #2. Store in ampule (before single use). Since the bromine is in a sealed, glass ampule it will not present a vapor problem.

Disposal: #12a

Shelf Life: As packaged, excellent. This is meant to be a one-time-use product.

Soluble: Most organic solvents; slightly in water.

Color: Dark red/brown

Odor: Irritating, chlorine-like.

CAS No. 7726-95-6

A3

Technical Note: Keep a supply of sodium thiosulfate solution (hypo) on hand as a neutralizer when working with bromine.

Safety Purchase Suggestion: Bromine diffusion tubes (AP8474) are a great way to safely demonstrate the properties of bromine gas. See page 317.

Simple and Safe Bromine Packaging

Elemental bromine is sold in a sealed 1-g ampule. The ampule is scored to allow the science instructor to easily break it into 50 mL of distilled water to prepare bromine water.



Bromine Water

saturated
0.5 mL of bromine per 100 mL of water

B0166 100 mL $ 7.86
B0021 500 mL 13.06
(Both package sizes packaged in PVC-coated bottles)

Due to D.O.T. regulations, this product must be shipped via truck. Truck freight is very expensive, $75 or more. Try to order with as many other items as possible to justify this very high shipping cost.

★ **HAZARD ALERT:** Toxic by inhalation and ingestion; skin irritant.

Storage: Inorganic #2 in a Flinn *Saf-Stor*® Can.

Disposal: #12a

Shelf Life: Fair. Bromine vapors degrade bottle caps over time. To avoid corrosion of metals in storage area, always store in a Flinn *Saf-Stor*® Can.

Color: Red/brown

Odor: Irritating, chlorine-like.

A3

Safety Purchase Suggestion: Please consider buying the bromine water kit or bromine in the sealed ampule. The sealed ampule is easily opened, added to water and results in a ready-to-use small quantity of bromine water. The bromine water kit will safely prepare bromine water in minutes. Both are safer shelf packages for the science teacher.

Technical Note: Keep a supply of sodium thiosulfate solution (hypo) on hand as a neutralizer when working with bromine.

Bromine Water Kit

AP4502 kit $15.00

Safely prepare fresh bromine water in any amount in less than five minutes with the Flinn Bromine Water Preparation Kit. Never again will you have to worry about the storage, handling, and use of elemental bromine. With our kit, you've not only eliminated the most corrosive chemical from your stockroom, but you've saved money—our preparation kit can be shipped U.P.S. Kit contains all the ingredients and instructions to prepare 500 mL of fresh bromine water using a traditional redox reaction. Special bottle, cap, and label are also included to ensure your bromine water is prepared and stored in a safe manner. Save money and eliminate a storage problem with this easy-to-use kit.

Bromobenzene

phenyl bromide
C_6H_5Br
F.W. 157.02

B0167 50 mL $13.11
B0138 100 mL 23.51

★ **HAZARD ALERT:** Moderate fire risk; skin irritant; slightly toxic by ingestion and inhalation. LD_{50} 2699 mg/kg.

Storage: Organic #4

Disposal: #4b

Shelf Life: Indefinite

Soluble: Miscible with most organic solvents; insoluble in water.

Color: Colorless

Odor: Like moth balls

CAS No. 108-86-1

B4

Bromoform

tribromomethane
stabilized with 1–3% ethyl alcohol
$CHBr_3$
F.W. 252.75

B0024 25 g $22.35

★ **HAZARD ALERT:** Slightly toxic; lachrymator. TLV 5.2 mg/m^3. LD_{50} 1147 mg/kg.

Storage: Organic #4

Disposal: #27j

Shelf Life: Good

Soluble: Alcohol and many organic solvents

Color: Colorless

Odor: Chloroform-like

CAS No. 75-25-2

B4

Bromphenol Blue

indicator, sodium salt
pH 3.0 yellow to 4.6 purple
reagent, powder
$C_{19}H_9Br_4O_5SNa$
F.W. 691.97

B0043 1 g $ 6.60
B0044 5 g 15.95

Storage: Organic #9

Disposal: #26a

Shelf Life: Indefinite

Soluble: Water

Color: Dark green

Odor: None

CAS No. 62625-28-9

D4

Quietly Destructive

Bromine attacks metals. Bromine vapor leaves a container and slowly but surely destroys all nearby metal surfaces. Our heat-sealed, single use ampule solves this bromine vapor problem. If you already have bromine in a capped bottle and want to minimize further damage, place the bottle in a plastic bag and seal it with a twist tie. Then place the bagged bromine bottle inside a paint can containing cat litter (see Flinn *Chem-Saf*® Bags and *Saf-Stor*® Cans on page 887). Replace the metal can about every 18–24 months.

Bromphenol Blue Indicator Solution

0.04%, aqueous

	B0065	100 mL	$5.10

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Dark purple
Odor: None



Bromthymol Blue

indicator, sodium salt
pH 6.0 yellow to 7.6 blue
powder
$C_{27}H_{27}Br_2O_5SNa$
F.W. 646.38

Reagent	B0045	1 g	$ 4.95
	B0046	5 g	18.25
Laboratory grade	B0233	5 g	9.90

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Green/brown
Odor: None
CAS No. 34722-90-2



Bromthymol Blue Indicator Solution

0.04%, aqueous

B0173	100 mL	$2.75
B0047	500 mL	5.35
B0228	1000 mL	8.95

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Deep blue
Odor: None



Buffer Solutions

pH accuracy ±0.02 at 25 °C.
500 mL bottle

Catalog No.	pH Value	Price
B0087	2.00	$10.80
B0088	3.00	10.80
B0089	4.00 (red)	5.00
B0090	5.00	10.80
B0091	6.00	10.80
B0092	7.00 (green)	5.00
B0093	8.00	10.80
B0094	9.00	10.80
B0095	10.00 (blue)	5.00
B0096	11.00	10.80
B0097	12.00	10.80

★ **HAZARD ALERT:** Buffers in low pH range are strongly acidic; those in high pH range are strongly alkaline.

Storage: Best and most conveniently stored together with proper recognition and precaution for their individual acid or alkaline nature. Keep bottles tightly closed.

Disposal: #26b

Shelf Life: Ready-to-use Buffer Solutions' shelf life varies depending on pH value. They vary from good to poor. The higher the pH value, the shorter the shelf life. Storage conditions vary so widely that it isn't possible to be specific about shelf life. Concentrated buffers, buffer capsules and buffers in Chemvelopes® all have better long-term shelf life than standard buffers.

Technical Note: The pH 4, 7 and 10 buffer solutions are dyed for convenience, to allow easy identification and prevent confusion. These three buffers are the standards used to calibrate pH meters.

Buffer Solutions

concentrated
pH accuracy ±0.02 at 25 °C.

pH 4.00 when 1 volume is diluted to 5 volumes

B0098	500 mL	$10.75

pH 7.00 when 1 volume is diluted to 25 volumes

B0099	500 mL	13.65

pH 10.00 when 1 volume is diluted to 10 volumes

B0100	500 mL	11.45

★ **HAZARD ALERT:** Low and high pH concentrates (pH 4 and 10) should be treated as strongly acidic and alkaline solutions, respectively.

Storage: With Inorganic #2 family for convenience

Disposal: #26b

Shelf Life: Much better than prepared buffers that are ready to use. Concentrates last longer and take up less shelf space.

HOW TO...

Understand Buffer Solutions and pH

What is pH?

The pH scale represents the acidity or alkalinity of an aqueous solution. pH is defined as the negative logarithm of the hydrogen ion concentration of a solution. $pH = -\log[H^+]$.

Absolutely pure water is the standard used in determining pH value. Since the pH scale is derived from the chemical properties of water, the scale cannot be used with non-aqueous solutions. The pH scale was established with a range of 0 to 14 pH units. The low end of the scale is acid, the high end alkaline, with pH 7.00, at the mid-point, being neutral.

Each unit on the pH scale represents a tenfold difference in acidity level. For example, pH 4 is ten times as acidic as pH 5. A pH 3 solution has ten times the acidity level of a pH 4 solution and 100 times the acidity level of a pH 5 solution.

What is a buffer?

A buffer is a chemical substance that resists changes in pH upon the addition of excess strong acid or strong base.

A buffer solution contains both a weak acid and a weak base. The weak acid component neutralizes any excess strong base added to the solution, while the weak base component neutralizes any excess strong acid that may be added. As a result, a buffer solution maintains a constant hydrogen ion concentration despite the addition of relatively large quantities of acid or base.

Science teachers should know that water (distilled or deionized) has no "buffer effect." In fact, the use of "dip and read" test papers will quickly influence the pH of the pure water. Almost always, the test paper used in such water will read pH 5.00 after the paper has been dipped in the water even though the actual pH of the water may be entirely different. In this example, the test paper itself has had an effect on the pH value of the water. Good quality water is not a substitute for a buffer.

What are pH test papers?

pH papers are made with special indicator dyes that react (change color) at specific pH values. Two pH units is the useful limit for most indicators and indicator papers. No further perceptible color change will occur regardless of a further pH change in the solution being tested. For example, with a pH 6.00 to 8.00 range test paper, a reading can be successfully taken if the pH falls between the aforementioned points. If the pH is actually below 6.00 or higher than 8.00, the test paper cannot detect that change but will simply change color to one extreme or the other of its 2.00 pH unit range.

pH papers may not be reliable in aqueous solutions containing proteins or alkaloids (an alkaloid is a nitrogen-based substance of plant origin, for example, nicotine).

Buffer Capsules

pH accuracy ±0.02 at 25 °C.
stable dry powder in capsules
quickly and completely soluble
each capsule makes 100 mL of buffer solution
10 capsules per vial

Catalog No.	pH Value	Price
B0101	2.00	All Values $7.95
B0102	3.00	
B0103	4.00	
B0104	5.00	
B0105	6.00	
B0106	7.00	
B0107	8.00	
B0108	9.00	
B0109	10.00	
B0110	11.00	
B0111	12.00	
B0227*	2.00–12.00	$12.50

*This special package contains 11 capsules, one of each pH value.

★ **HAZARD ALERT:** Low and high pH buffer solutions should be treated as strongly acidic and alkaline solutions, respectively.

Storage: Wherever convenient—no special storage requirements.

Disposal: #26a

Shelf Life: Indefinite; consume minimal shelf space and are very stable.

FLINN PRICES ARE GUARANTEED FOR A FULL YEAR

Buffer Envelopes

Chemvelopes®
each envelope makes 500 mL of buffer solution
5 envelopes of a single pH per carton
pH accuracy ±0.02 at 25 °C.

Catalog No.	pH Value	Price
B0112	2.00	$13.20/ carton
B0113	3.00	
B0114	4.00	
B0115	5.00	
B0116	6.00	
B0117	7.00	
B0118	8.00	
B0119	9.00	
B0120	10.00	
B0121	11.00	
B0122	12.00	
B0123*	2.00–12.00	$26.85

*This special package contains 10 envelopes, one envelope of each pH value from 2 to 11.

★ **HAZARD ALERT:** Low and high pH buffer solutions should be treated as strongly acidic and alkaline solutions, respectively.

Storage: Wherever convenient—no special storage requirements.

Shelf Life: Excellent; very stable and convenient to store.

Technical Note: Aluminum foil, polyethylene and paper protective envelopes. Envelopes keep buffers dry and free-flowing. Each envelope makes 500 mL when added to distilled water. Included in the package is a 7-mL dispensing vial of a buffer preservative. The preservative contains an effective antifungal, antibacterial agent. In addition, the preservative is a universal indicator which tints neutral solutions green, acid solutions orange-red, and basic solutions blue.

Buffer Solution Preservative

Clear	**B0175**	60 mL	**$12.00**
Indicating	**B0176**	60 mL	**14.85**

Technical Note: Buffer solutions, particularly basic pH buffers, tend to act as a media for fungus and bacteria growth. This buffer preservative contains a highly effective anti-fungal, anti-bacterial agent to provide long-term protection for buffer solutions and does not affect pH value. The preservative is available in two forms:

- preservative only (clear) (B0175)
- preservative with indicator (B0176)

If the preservative with indicator is used, the buffer will be tinted green for neutral solutions, orange-red for acid solutions and blue for basic solutions. Please specify whether you want clear, non-indicating preservative or the preservative with indicator. Three drops of preservative provides ample protection, and in the case of the indicating preservative, a distinct tint for 100 mL of buffer solution.

#1 IN VALUE

Don't be swayed by inflated prices and whopping discounts. Do your own price comparisons. You too will discover that when it comes to price and value, no one can beat Flinn Scientific. Guaranteed!

Buffer Solution, Electrophoresis

see Tris-Acetate Buffer

Burner Fuel

see Ethyl Alcohol (burner fuel)

Butanol

see Butyl Alcohol

n-Butyl Alcohol

1-butanol

reagent	**B0177**	100 mL	**$ 5.71**
$CH_3(CH_2)_2CH_2OH$	**B0032**	500 mL	**8.21**
F.W. 74.12	**B0033**	4 liters	**34.51**

★ **HAZARD ALERT:** Moderate fire risk; moderately toxic by inhalation and ingestion; eye irritant; absorbed by skin. LD_{50} 790 mg/kg. TLV 152 mg/m^3.

Storage: Organic #2 in a dedicated flammables cabinet; if one is not available, store in a Flinn *Saf-Stor*® Can.

Disposal: #18b

Shelf Life: Fair; substance may oxidize.

Soluble: Miscible with alcohol and ether; soluble with water.

Color: Colorless

Odor: Like strong wine

CAS No. 71-36-3

B4

Alcohols and Explosions

Recent events suggest that alcohols we earlier were unconcerned about can indeed develop explosive organic peroxides. Organic peroxides are unlikely to be a problem in fresh material. Solution: always know the age of your chemicals (Flinn chemicals are all age dated) and use only fresh materials. Also, do not distill the alcohol to dryness since this will concentrate the explosive peroxides.

sec-Butyl Alcohol

2-butanol
laboratory grade
$CH_3CHOHCH_2CH_3$ F.W. 74.12

B0178	100 mL	$ 7.21
B0034	500 mL	11.31

★ **HAZARD ALERT:** May form explosive peroxides on concentration. If you don't know the age of this material, do not use it. All Flinn chemicals are date labeled. Flammable, fire risk; eye irritant; absorbed by skin. LD_{50} 6480 mg/kg. TLV 300 mg/m^3.

Storage: Organic #2 in a dedicated flammables cabinet; if one is not available store in a Flinn *Saf-Stor*® Can.

Disposal: #18b

Shelf Life: Poor. Substance has been known to develop explosive peroxides. Buy only as little as possible and avoid prolonged storage.

Soluble: Miscible with alcohol and ether; slightly soluble with water.

Color: Colorless

Odor: Like rubbing alcohol

CAS No. 78-92-2



tert-Butyl Alcohol

2-methyl-2-propanol
laboratory grade
$(CH_3)_3COH$ F.W. 74.12

B0179	100 mL	$ 5.81
B0055	500 mL	12.41

★ **HAZARD ALERT:** Moderate fire risk; slightly toxic by ingestion and inhalation; eye irritant; absorbed by skin. LD_{50} 3500 mg/kg. TLV 303 mg/m^3.

Storage: Organic #2 in a dedicated flammables cabinet; if one is not available store in a Flinn *Saf-Stor*® Can.

Disposal: #18b

Shelf Life: Fair

Soluble: Miscible with alcohol and ether; slightly soluble with water.

Color: Colorless

Odor: Camphor

CAS No. 75-65-0



Technical Note: Melting point is 25 °C; this substance may be a solid at room temperature.

Butyl Phthalate

dibutyl phthalate
laboratory grade
$C_{16}H_{22}O_4$ F.W. 278.34

B0184	100 mL	$ 7.10
B0185	500 mL	17.95

★ **HAZARD ALERT:** Possible teratogen*; body tissue irritant. LD_{50} 8000 mg/kg.

Storage: Organic #3

Disposal: #18b

Shelf Life: Fair to poor

Soluble: Very slightly in water; soluble in many organic solvents.

Color: Colorless

Odor: None

CAS No. 84-74-2



*Teratogen = Causes growth abnormalities in embryos or genetic modification in cells.

Heavy Metals

Heavy metals, such as cadmium and cadmium compounds, are most dangerous as a fume or as a fine dust. Water soluble compounds are also toxic, but ingestion is extremely unlikely. If the form of cadmium you intend to use will not generate a fume or expose you to dust you might inhale, prudent practice suggests that it is not necessary to ban such substances. Many heavy metals serve useful purposes in our everyday life. Know the substance, how it can hurt you, and how it can be properly disposed. Don't be chemophobic!

Butyl Stearate

butyl octadecanoate
laboratory grade
$C_{22}H_{44}O_2$ F.W. 340.57

B0181	25 g	$ 5.20
B0182	100 g	10.50
B0183	500 g	28.50

★ **HAZARD ALERT:** Combustible solid.

Storage: Organic #3

Disposal: #18b

Shelf Life: Good; indefinite.

Soluble: Alcohol and ether; not water.

Color: Colorless

Odor: Faint, fatty odor

CAS No. 109-43-3



Technical Note: Melting point is 27 °C; may be a liquid or fused solid.

Butyric Acid

butanoic acid
laboratory grade
$CH_3CH_2CH_2COOH$ F.W. 88.11

B0180	25 mL	$ 9.15
B0139	100 mL	14.11
B0035	500 mL	26.91

(All above package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Obnoxious odor; stench agent; strong irritant to skin and eyes; flammable liquid; moderately toxic by ingestion and skin absorption. LD_{50} 2000 mg/kg.

Storage: Organic #1 inside a Flinn *Chem-Saf*® Bag and then inside Flinn *Saf-Stor*® Can.

Disposal: #24a

Shelf Life: Indefinite if stored properly.

Soluble: Water; miscible with alcohol and ether.

Color: Colorless

Odor: Penetrating and obnoxious; odor like vomit.

CAS No. 107-92-6



Special Precaution: Remove cap slowly and vent the container under a hood. This is particularly important if the butyric acid is at or above room temperature.

C

Cadmium

mossy
reagent
Cd A.W. 112.40

C0341	25 g	$ 7.75
C0001	100 g	17.63

★ **HAZARD ALERT:** A *known carcinogen;* dust or fume inhalation especially toxic. LD_{50} 225 mg/kg. TLV 0.01 mg/m^3 as dust.

Storage: Inorganic #1 in a Flinn *Saf-Stor*® Can.

Disposal: #27d

Shelf Life: Indefinite

Soluble: In acid, especially nitric; and in ammonium nitrate solution.

Color: Gray

Odor: None

CAS No. 7440-43-9



Safety Purchase Suggestion: Avoid this substance on school premises. If you do use it, practice strict hygiene.

Cadmium

sticks (approx. 4″ × ½″)	C0286	25 g	$22.00
reagent	C0164	100 g	55.95

For hazard alert, storage, disposal, etc., see Cadmium, mossy, C0341.



Cadmium-free Alloy

If your students are studying metallic structure and bonding, you may be seeking a cadmium-free alloy. Please see such an alloy under Onion's Fusible Alloy.

Cadmium Chloride

reagent, crystal
$CdCl_2 \cdot 2\frac{1}{2}H_2O$ F.W. 228.34

C0342	10 g	$ 7.45
C0193	25 g	19.60

★ **HAZARD ALERT:** A *known carcinogen;* dust inhalation especially toxic. LD_{50} 88 mg/kg.
Storage: Inorganic #2 in a Flinn *Chem-Saf*® Bag in a poisons cabinet.
Disposal: #27f
Shelf Life: Indefinite
Soluble: Water and acetone
Color: White
Odor: None
CAS No. 10108-64-2
Safety Purchase Suggestion: Avoid this substance on school premises. If you do use it, practice strict hygiene.



Cadmium Chloride, Gramolpak

0.1 Molar
(as $CdCl_2 \cdot 2\frac{1}{2}H_2O$) * C0383 pkg. $13.85

For hazard alert, storage, disposal, etc., see Cadmium Chloride, C0342.
*Gramolpak® is a unique package which makes 1 liter with distilled water.



Cadmium Chloride Solution

0.1 Molar
(as $CdCl_2 \cdot 2\frac{1}{2}H_2O$) C0375 100 mL $7.65

★ **HAZARD ALERT:** Toxic by ingestion.
Storage: Inorganic #2 in a Flinn *Chem-Saf*® Bag.
Disposal: #27f
Shelf Life: Indefinite
Color: Colorless
Odor: None



Cadmium Nitrate

reagent, crystal
$Cd(NO_3)_2 \cdot 4H_2O$ F.W. 308.49

C0343	10 g	$10.25
C0194	25 g	15.60
C0003	100 g	30.61

★ **HAZARD ALERT:** A *known carcinogen;* moderately toxic by inhalation and ingestion; strong oxidizer; fire and explosion risk. LD_{50} 305 mg/kg.
Storage: Inorganic #3 in a Flinn *Chem-Saf*® Bag.
Disposal: #27f
Shelf Life: Indefinite
Soluble: Water, ammonia and alcohol.
Color: White
Odor: Slight nitric acid
CAS No. 10022-68-1
Safety Purchase Suggestion: Avoid this substance on school premises. If you do use it, practice strict hygiene.



Cadmium Nitrate, Gramolpak

0.2 Molar
(as $Cd(NO_3)_2 \cdot 4H_2O$) * C0384 pkg. $7.50

For hazard alert, storage, disposal, etc., see Cadmium Nitrate, C0343.
*Gramolpak® is a unique package which makes 100 mL with distilled water.



Cadmium Nitrate Solution

0.1 Molar
(as $Cd(NO_3)_2 \cdot 4H_2O$) C0376 500 mL $10.00

★ **HAZARD ALERT:** A *known carcinogen;* toxic by ingestion.
Storage: Inorganic #3 in a Flinn *Chem-Saf*® Bag.
Disposal: #27f
Shelf Life: Indefinite
Color: Clear
Odor: Slight nitric acid



Caffeine

alkaloid
laboratory grade, powder
$C_8H_{10}N_4O_2$ F.W. 194.20

C0344	25 g	$ 7.90
C0006	100 g	15.85

★ **HAZARD ALERT:** *Very toxic;* as little as 65 mg can be life-threatening. LD_{50} 192 mg/kg.
Storage: Organic #2 in a Flinn *Chem-Saf*® Bag.
Disposal: #5
Shelf Life: Fair to poor; effloresces in air—possibly resulting in decomposition. Store in a Flinn *Chem-Saf*® Bag.
Soluble: Chloroform; partially in water and alcohol.
Color: White
Odor: None
CAS No. 58-08-2





Calcium

reagent grade, turnings
Ca
A.W. 40.08

C0345	10 g	$ 5.05
C0007	25 g	9.70
C0008	100 g	17.91
C0009	500 g	54.11

★ **HAZARD ALERT:** Contact with water or moisture evolves flammable hydrogen. Flammable in finely divided form. Avoid contact with oxidizers; skin irritant.
Storage: Inorganic #1 in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can.
Disposal: #3
Shelf Life: Good; but only if stored under airtight conditions.
Soluble: In acid; decomposes in water.
Color: Gray/black
Odor: None
CAS No. 7440-70-2



Calcium Acetate

calcium ethanoate
laboratory grade, powder
$Ca(C_2H_3O_2)_2 \cdot H_2O$ F.W. 176.19

C0262	100 g	$ 5.05
C0010	500 g	12.55

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; hygroscopic.
Soluble: Water; slightly in alcohol.
Color: White
Odor: Slight vinegar
CAS No. 62-54-4



Calcium Acetate, Gramolpak

0.5 Molar
(as $Ca(C_2H_3O_2)_2 \cdot H_2O$) * C0386 pkg. $5.60

For storage, disposal, etc., see Calcium Acetate, C0262.
*Gramolpak® is a unique package which makes 250 mL with distilled water.



Cans—Great Friends

Flinn Scientific packages calcium and many other similar substances in metal cans. Why? Because the package, i.e., the can, is the most protective container economically available to hold this substance. When you have to deal with an item that is unusually hazardous, think immediately of plastic bags and outer cans as a great way to "additionally" protect such devils. Put your bottle into a bag and then into a can. See Flinn *Chem-Saf*® Bags and *Saf-Stor*® Cans on page 887.

Calcium Carbide

laboratory grade, lump
CaC_2
F.W. 64.10

	C0346	100 g	$ 5.21
	C0011	500 g	7.31
	C0250	2 kg	22.93

★ **HAZARD ALERT:** Exposure to water or moisture evolves flammable acetylene gas; corrosive to eyes and skin. 500 grams of calcium carbide will yield approximately 150 liters of flammable acetylene.

Storage: Inorganic #5 in a Flinn *Saf-Stor*® Can.
Disposal: #25
Shelf Life: Good if stored under dry conditions.
Soluble: Water with decomposition resulting and evolution of heat.
Color: Gray/black
Odor: Garlic-like
CAS No. 75-20-7



Incompatibility: Water, dilute acids, halogens, silver nitrate, copper compounds and heavy metals.

Calcium Carbonate

powder
F.W. 100.09

Laboratory grade	C0347	100 g	$ 5.50
$CaCO_3$ precipitated	C0012	500 g	7.95
Natural chalk	C0013	500 g	$ 6.65
ground limestone	C0014	2 kg	15.55

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Excellent
Soluble: Slightly in water; in acids with evolution of carbon dioxide.
Color: White
Odor: None
CAS No. 471-34-1



Technical Note: Laboratory grade $CaCO_3$ is precipitated $CaCO_3$ and is 98–99% purity. Natural chalk is ground limestone and is 96% purity.

Calcium Carbonate

for generating carbon dioxide
see Marble Chips

Calcium Chloride

dihydrate
$CaCl_2 \cdot 2H_2O$
F.W. 147.02

Reagent	C0196	100 g	$ 7.10
powder	C0015	500 g	16.95
Laboratory grade	C0018	500 g	$ 4.80
flake	C0019	2 kg	16.25

★ **HAZARD ALERT:** Slightly toxic. LD_{50} 1000 mg/kg.
Storage: Inorganic #2
Disposal: #26a

Continued on next column.

What Does Slightly Toxic Mean?

Flinn Scientific uses a toxicity standard similar to the *Prudent Practices in the Laboratory* standard. Flinn defines slightly toxic materials as those with an Oral-Rat LD_{50} of 1000–5000 mg/kg or Inhalation-Rat LC_{50} of 2200–22,000 ppm/hr. For a 50-kg person (about 110 lbs), 1000 mg/kg translates into consuming about 4 tablespoons of the chemical; 5000 mg/kg is almost 20 tablespoons! Rely on Flinn to help you understand chemical hazards and how they can affect you.

Shelf Life: Fair to poor; deliquescent; keep bottle tightly closed and store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 10035-04-8



Calcium Chloride

anhydrous
4–8 mesh granules
$CaCl_2$
F.W. 110.99

	C0016	500 g	$ 5.50
	C0017	2 kg	13.40

For storage, disposal, etc., see Calcium Chloride, C0018.
CAS No. 10043-52-4



Technical Note: An effective drying agent for desiccators and drying tubes.

Calcium Chloride

for drying, also see Drierite®—a special form of calcium sulfate which absorbs both by hydration and capillary action.

Calcium Chloride, Gramolpak

0.1 Molar
(as $CaCl_2 \cdot 2H_2O$)

	* C0387	pkg.	$5.00

For storage, disposal, etc., see Calcium Chloride, C0196.
*Gramolpak® is a unique package which makes 1 liter with distilled water.



Calcium Chloride Solution

(as $CaCl_2 \cdot 2H_2O$)

0.1 Molar	C0234	500 mL	$4.55
1 Molar	C0233	500 mL	8.40

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Calcium Ethanoate

see Calcium Acetate

Calcium Fluoride

native fluorspar
CaF_2
F.W. 78.08

	C0020	500 g	$7.85

★ **HAZARD ALERT:** Slightly toxic; skin irritant. LD_{50} 4250 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Ammonium salts; not water.
Color: Gray/white
Odor: None
CAS No. 7789-75-5



Calcium Hydroxide

powder
$Ca(OH)_2$
F.W. 74.10

Reagent	C0197	100 g	$ 7.05
	C0021	500 g	13.25
Laboratory grade	C0022	500 g	$ 6.55
	C0023	1.5 kg	12.30

★ **HAZARD ALERT:** Skin irritant; avoid dust inhalation. TLV 5 mg/m^3. LD_{50} 7340 mg/kg.

CALCIUM HYDROXIDE continued on next page.

CALCIUM HYDROXIDE *continued*

Storage: Inorganic #4
Disposal: #10
Shelf Life: Fair to poor; absorbs carbon dioxide from air; keep tightly closed; store in a Flinn *Chem-Saf*® Bag.
Soluble: Slightly in water; soluble in glycerol or acids; insoluble in alcohol.
Color: Gray/white
Odor: None
CAS No. 1305-62-0



Calcium Hydroxide Solution (Saturated)

see Limewater Solution

Calcium Hypochlorite

65–70% available chlorine
granular
$Ca(OCl)_2$
F.W. 142.99

	C0348	100 g	$ 6.60
	C0024	500 g	11.95

★ **HAZARD ALERT:** Moderately toxic by ingestion and inhalation; fire risk in contact with organic substances; an oxidizer. Body tissue irritant. LD_{50} 850 mg/kg.
Storage: Inorganic #6 in Flinn *Chem-Saf*® Bag.
Disposal: #12a
Shelf Life: Fair to poor; decomposes in moist air; store under dry conditions in a Flinn *Chem-Saf*® Bag.
Soluble: Decomposes in water and alcohol.
Color: Off-white
Odor: Chlorine-like
CAS No. 7778-54-3



Calcium Iodide Solution

0.1 Molar
(as $CaI_2 \bullet xH_2O$*)
*Varies from 4–6 H_2O

C0378	100 mL	$8.95
	(Packaged in PVC-coated bottles)	

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite; protect from light.
Color: Yellow
Odor: None



Calcium Nitrate

crystal
$Ca(NO_3)_2 \bullet 4H_2O$
F.W. 236.16

Reagent	C0349	25 g	$ 5.45
	C0025	100 g	7.71
	C0026	500 g	15.91
Laboratory grade	C0350	100 g	$ 5.91
	C0166	500 g	10.41

★ **HAZARD ALERT:** Strong oxidizer; potential fire risk in contact with organic material; may explode if shocked or heated. Slightly toxic. LD_{50} 3900 mg/kg.
Storage: Inorganic #3
Disposal: #26a
Shelf Life: Fair to poor; deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, alcohol and acetone.
Color: Colorless
Odor: None
CAS No. 13477-34-4



Calcium Nitrate, Gramolpak

0.1 Molar
(as $Ca(NO_3)_2 \bullet 4H_2O$)

* C0388	pkg.	$4.35

For hazard alert, storage, disposal, etc., see Calcium Nitrate, C0349.
*Gramolpak® is a unique package which makes 1 liter with distilled water.

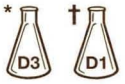


Calcium Nitrate Solution

(as $Ca(NO_3)_2 \bullet 4H_2O$)

0.5 Molar*	C0235	500 mL	$7.55
0.1 Molar†	C0236	500 mL	5.90

Storage: Inorganic #3
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Calcium Oxide

CaO
F.W. 56.08

Reagent	C0263	100 g	$ 5.65
powder	C0027	500 g	13.20
Laboratory grade	C0264	100 g	$ 5.30
lump	C0028	500 g	7.95
	C0029	2 kg	19.95

★ **HAZARD ALERT:** Corrosive; dangerous in contact with organic material; exposure to water or moisture evolves heat. A lump of calcium oxide may disintegrate violently when water is added. Wear eye protection when handling this substance. TLV 2 mg/m^3.
Storage: Inorganic #4 in a Flinn *Chem-Saf*® Bag.
Disposal: #10
Shelf Life: Fair to poor; protect from moisture; store in a Flinn *Chem-Saf*® Bag.
Soluble: Acid; reacts with water to form calcium hydroxide and evolves heat.
Color: Off-white
Odor: None
CAS No. 1305-78-8



★ **SPECIAL HAZARD ALERT:** Avoiding moisture contact is important in storing this substance. Science teachers frequently report cracked glass bottles. We suggest high humidity exposure may have resulted in the generation of sufficient heat to crack or break the glass bottle. Flinn's product is not packaged in glass; however, that does not negate the need to keep this substance dry. We package this substance in a plastic bottle. The bottle is in a plastic bag and contained within the bag is a desiccant to reduce or absorb moisture. Continue to store this material under similar conditions. Buy only small quantities of this substance.

Calcium Phosphate, Monobasic

laboratory grade, powder
$Ca(H_2PO_4)_2 \bullet H_2O$
F.W. 252.08

C0351	100 g	$ 6.45
C0030	500 g	10.80

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and acids
Color: White
Odor: None
CAS No. 10031-30-8



The Package Can Be Dangerous!

Those of you whose school administrations allow the unsafe practice of "bidding" laboratory chemicals to continue will find an interesting example of trouble from "low bid" chemicals on this page. Read the special hazard alert for calcium oxide and ask yourself whether your "low bid" chemical meets these safer packaging standards. None of our competitors package the substance to these standards. With bids, you get what you pay for!

Calcium Phosphate, Dibasic

laboratory grade, powder

$CaHPO_4$	**C0352**	50 g	**$ 6.75**
F.W. 136.06	**C0228**	100 g	**10.55**
	C0167	500 g	**15.25**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Dilute acetic, hydrochloric and nitric acid; slightly in water; insoluble in alcohol.
Color: White
Odor: None
CAS No. 7757-93-9



Calcium Phosphate, Tribasic

laboratory grade, powder

$Ca_{10}(OH)_2(PO_4)_6$	**C0265**	100 g	**$15.20**
	C0168	500 g	**38.35**

★ **HAZARD ALERT:** Body tissue irritant.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Acids except acetic; insoluble in water and alcohol.
Color: White
Odor: None
CAS No. 12167-74-7



Calcium Sulfate

reagent, powder

dihydrate	**C0353**	50 g	**$ 7.55**
$CaSO_4 \bullet 2H_2O$	**C0198**	100 g	**11.70**
F.W. 172.17	**C0031**	500 g	**22.85**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Slightly in water
Color: White
Odor: None
CAS No. 10101-41-4



Calcium Sulfate

plaster of paris

hemihydrate	**C0032**	500 g	**$ 4.75**
$CaSO_4 \bullet \frac{1}{2}H_2O$	**C0033**	2 kg	**12.75**
F.W. 145.15	**C0266**	12 kg	**53.45**

Storage: Inorganic #2 in a Flinn *Chem-Saf*® Bag.
Disposal: #26a
Shelf Life: Poor unless kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Slightly in water.
Color: Off-white
Odor: None
CAS No. 10034-76-1



Calcium Sulfate

for drying—see Drierite®

Reduce Fire Risk

1. Store chemicals in chemically compatible families.
2. Buy and store only the minimum quantity of flammables needed.
3. Store flammables in dedicated flammables cabinets.
4. Provide good ventilation in chemical stores areas.
5. Use water baths, heating mantles and hot plates in lieu of Bunsen burners or alcohol burners.
6. Buy and store flammables in metal packages, plastic or PVC-coated bottles, rather than glass.
7. Dispose of waste solvents responsibly.

Calgon®

see Sodium Hexametaphosphate

Calmagite

indicator
used for determination of magnesium

$C_{17}H_{14}N_2O_5S$	**C0002**	5 g	**$25.95**
F.W. 358.37			

★ **HAZARD ALERT:** Tissue irritant.
Storage: Organic #9
Disposal: #26a
Shelf Life: Good
Soluble: Water
Color: Pink
Odor: None
CAS No. 3147-14-6



Camphor

laboratory grade

$C_{10}H_{16}O$	**C0354**	25 g	**$6.95**
F.W. 152.25	**C0034**	100 g	**8.30**

★ **HAZARD ALERT:** If heated, flammable and explosive vapors evolve; moderately toxic. TLV 12 mg/m³.
Storage: Organic #4
Disposal: #18b
Shelf Life: Indefinite
Color: White
Odor: Penetrating, aromatic; like a chest rub.
CAS No. 76-22-2



Candles

Birthday type	**C0226**	pkg./24	**$ 1.25**
2½″ × ¼″			
White	**C0192**	pkg./4	**$ 4.60**
5″ × 1¼″	**C0229**	pkg./20	**16.70**
plumber's candles			

Storage: Miscellaneous non-hazardous organic materials.
Disposal: #26a
Shelf Life: Indefinite



Candle Use Suggestion: Mount candles on 3″ × 5″ cards to prevent students from using the lab bench top or expensive wire gauze squares for catching the melting wax. The cards make good drip catchers.

Capric Acid

see Decanoic Acid

Carbol Fuchsin Solution

Ziehl-Nielsen
contains: basic fuchsin, ethyl alcohol, phenol, and water

	C0409	100 mL	**$ 7.63**
	C0154	500 mL	**15.73**

★ **HAZARD ALERT:** Moderately toxic by ingestion and inhalation. Skin irritant.
Storage: Organic #8
Disposal: #26b
Shelf Life: Indefinite
Color: Rose/purple
Odor: Strong phenol



Carbolic Acid

see Phenol

Carbon

see Charcoal and Graphite listings

Carbon Rod

for use as inert electrode in electrochemical cells — C0410 — pkg./6 — $8.30

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Good
Color: Black
Odor: None
CAS No. 7782-42-5



Purchase Suggestion

If you use a lot of gases, consider our refillable gas cylinders. They provide more gas, eliminate disposal problems and save you money. See page 249 of this Catalog/Reference Manual for more information.

Carbon Dioxide Gas

Lecture bottle — LB1005 — 0.5 lb (approximately 125 liters) — $119.01

Refillable cylinder — LB1060 — 1.0 lb (approximately 250 liters) — $214.21

★ **HAZARD ALERT:** In solid form (solidified carbon dioxide—commonly known as dry ice) is very damaging to skin and eyes.

Storage: A cabinet dedicated to bottled gas storage
Disposal: Completely empty lecture bottle in an operating fume hood then follow #26a.
Shelf Life: Indefinite
Soluble: Slightly soluble in water, hydrocarbons, and most organic solvents.
Color: Colorless
Odor: None
CAS No. 124-38-9



Special Note: Carbon dioxide lecture bottle is color-coded solid brown.

Carbon Dioxide Gas Preparation: CO_2 gas can be produced from dry ice. One to two pounds of dry ice should provide sufficient gas for 40–50 students. You will have to set up a generator apparatus that will enable you to heat the dry ice by placing chunks in a water bath. The evolution of gas is not sufficient unless warmed by water. Your delivery tube (from the generator) should be rather long to allow the gas to reach room temperature. A drying tube will also have to be part of the apparatus to remove moisture.

Some teachers set up a CO_2 generator using a flask (about 250 mL size) into which is placed a long-stem funnel and delivery tube. Using about 25 grams of calcium carbonate (Flinn Catalog Nos. C0347, C0012, C0013, and C0014) and 6 Molar hydrochloric acid (Flinn Catalog No. H0033) will produce approximately 6 liters of CO_2 at room temperature and atmospheric pressure. A drying tube should be a part of the generation apparatus.

Carbon Disulfide

reagent
CS_2
F.W. 76.14

C0199 — 100 mL — $13.83
C0035 — 500 mL — 26.83
(All above package sizes packaged in PVC-coated bottles)

Due to D.O.T. regulations, this product must be shipped via truck. Truck freight is very expensive, $75 or more. Try to order with as many other items as possible to justify this very high shipping cost.

★ **HAZARD ALERT:** *Dangerous* fire and explosion risk; flash point –22 °F (–30 °C); can be ignited by friction; vapor heavier than air and may travel at floor level—thus distant ignition is possible; moderately toxic by ingestion and inhalation. TLV 20 mg/m^3. LD_{50} 3188 mg/kg.

Continued on next column.

CARBON DISULFIDE *continued*

Storage: Inorganic #5 (classed as an inorganic compound) but *only in a dedicated flammables cabinet* or at the very least, inside a Flinn *Saf-Stor*® Can insulated with vermiculite.
Disposal: #9
Shelf Life: Good; but only if stored properly.
Soluble: Alcohol, benzene and ether; only slightly in water.
Color: Colorless
Odor: Rotten eggs
CAS No. 75-15-0



Technical Note: Frequently the only purpose a science teacher has for carbon disulfide is as a sulfur solvent in a laboratory exercise to determine the type of crystal an element forms; e.g., allotropic forms of sulfur. You might try the following procedure to prepare the orthorhombic form of sulfur that does not require the use of carbon disulfide.

A. Place 5 mL of olive oil (Flinn Catalog No. Q0004) into a 50-mL beaker.
B. Place 2 grams of roll sulfur (Flinn Catalog No. S0140) into the beaker and stir into the olive oil until well mixed. Heat gently for about 10–15 seconds while stirring.
C. Immediately pour a small quantity of the mixture onto a watch glass.
D. Magnification will probably be necessary to view the small crystals formed. A hand-held magnifier (Flinn Catalog No. AP8256) will work well.



Carborundum

powder — C0355 — 100 g — $11.95
C0039 — 500 g — 30.95

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Not soluble in common solvents.
Color: Charcoal gray
Odor: None
CAS No. 409-21-2



Carmine

alum lake, natural red 4
biological stain — C0356 — 1 g — $ 9.25
laboratory grade — C0230 — 2.5 g — 17.50

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Slightly in hot water; alkali solutions; insoluble in dilute acids.
Color: Rose/red
Odor: None
CAS No. 1390-65-4
C.I. #75470



All It Takes Is Friction

How can we describe the extreme fire hazard of carbon disulfide? We could use words like severe. We could emphasize the flash point…it will flash at almost 50 °C below room temperature! Will almost any source of heat set it off? Certainly, all it takes is friction. Imagine that…just friction. Please treat this substance with respect.

Carmine-Aceto Solution

Schneider
stain and fixative solution
contains: carmine, acetic acid and water

C0259	25 mL	$ 8.15
C0116	100 mL	15.25

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Corrosive to body tissues; moderately toxic by ingestion.
Storage: Organic #9
Disposal: #24a
Shelf Life: Indefinite
Color: Rose
Odor: Strong vinegar



Carnauba Wax

yellow 1 C0357 100 g $24.70

Storage: Organic #3
Disposal: #26a
Shelf Life: Indefinite
Soluble: Ether; boiling alcohol and alkali; insoluble in water.
Color: Yellow
Odor: None
CAS No. 8015-86-9





Carnoy's Solution

fixative
contains: acetic acid, chloroform and ethyl alcohol

C0117 100 mL $11.40
(Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Flammable liquid; store in a dedicated flammables cabinet or, failing that, inside a Flinn *Saf-Stor*® Can. Moderately toxic.
Storage: Organic #2
Disposal: #18b
Shelf Life: Good if stored properly.
Color: Slightly yellow
Odor: Alcohol-like



Casein

milk protein
laboratory grade, powder C0043 100 g $8.10

Storage: Organic #2
Disposal: #26a
Shelf Life: Fair to poor; deteriorates when damp; store in a Flinn *Chem-Saf*® Bag.
Soluble: Dilute alkalies and concentrated acids; only slightly in water.
Color: Buff
Odor: None
CAS No. 9000-71-9



Biological Chemicals

Our catalase listing on this page is an example of how we provide more than just a naked catalog listing that tells nothing about a substance except name, package size and price. Flinn is the problem-solving supplier to the biology teacher as well as the chemistry teacher.

Catalase

from bovine liver
oxidizing enzyme C0359 1 g $28.95

Storage: Organic #1
Disposal: #26a
Shelf Life: Poor; keep refrigerated.
Color: Brown/gray
Odor: None
CAS No. 9001-05-2



Technical Note: This substance is used to decompose hydrogen peroxide. An enzyme rate of reaction is measured. Units of activity are shown on the substance label and vary from lot to lot. Currently (late 2001) our label shows 2100 units per milligram solid. We provide a technical data sheet to help you make this solution. An analytical quality (fourth decimal place) balance will be required to weigh out material to make this solution. Catalase solution must always be very fresh. Even a solution that is just a few hours old will render poor results.

Catechol

catechin hydrate C0418 1 g $21.20

Storage: Organic #8
Disposal: #26a
Shelf Life: Indefinite
Soluble: Slightly in water
Color: White
Odor: None
CAS No. 154-23-4



Technical Note: Used in Enzymes: Catalysts of Life lab in *Biology: The Web of Life Lab Manual*.

Caustic Potash

see Potassium Hydroxide

Caustic Soda

see Sodium Hydroxide

Cedarwood Oil

for immersion C0044 100 mL $19.95
(Packaged in PVC-coated bottles)

Storage: Organic #3
Disposal: #18b
Shelf Life: Indefinite
Color: Yellowish
Odor: None
CAS No. 8000-27-9



Cellulase

enzyme complex that degrades cellulose
fine powder C0172 25 g $31.00

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Buff
Odor: Ginger
CAS No. 9012-54-8



Cellulose

laboratory grade, powder
chromatography C0269 100 g $12.40
C0045 500 g 30.75

Storage: Organic #2
Disposal: #26a
Shelf Life: Good if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Insoluble in water and organic solvents.
Color: Off-white
Odor: None
CAS No. 9004-34-6



Cellulose Acetate

flake — C0270 — 100 g — $14.55

Storage: Organic #3
Disposal: #18b
Shelf Life: Indefinite
Soluble: Acetone, ethyl acetate and ethylene dichloride.
Color: White
Odor: None
CAS No. 9004-35-7



Cerium (IV) Ammonium Nitrate

ceric ammonium nitrate
reagent
$(NH_4)_2Ce(NO_3)_6$ — C0287 — 25 g — $10.85
F.W. 548.23

★ **HAZARD ALERT:** Strong oxidizer; avoid contact with organic material; dangerous fire risk; skin irritant.
Storage: Inorganic #3
Disposal: #27f
Shelf Life: Good
Soluble: Water and alcohol
Color: Orange/red
Odor: Slight nitric acid
CAS No. 16774-21-3



Cesium Chloride

laboratory grade, crystal
CsCl — C0406 — 5 g — $12.60
F.W. 168.36 — C0417 — 25 g — 32.80

★ **HAZARD ALERT:** Slightly toxic by ingestion. LD_{50} 2600 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Somewhat hygroscopic, keep tightly closed.
Soluble: Water
Color: White
Odor: None
CAS No. 7647-17-8
Technical Note: Produces a brilliant violet color in flame tests.



Cetyl Alcohol

1-hexadecanol
laboratory grade, flake
$CH_3(CH_2)_{14}CH_2OH$ — C0200 — 100 g — $ 9.65
F.W. 242.43 — C0155 — 500 g — 22.60

★ **HAZARD ALERT:** Slightly toxic by ingestion; body tissue irritant. LD_{50} 5000 mg/kg.
Storage: Organic #2
Disposal: #18b
Shelf Life: Indefinite
Soluble: Partially in alcohol and ether; insoluble in water.
Color: White
Odor: Faint citrus-like
CAS No. 36653-82-4
Technical Note: A safer alternative for melting point determination: melting point is 54–56 °C.



Chalk

see Calcium Carbonate

Charcoal, Block

4¾" × 1⅛" × 1$_{1/16}$" — C0203 — pkg./4 — $12.30
C0145 — pkg./12 — 27.60

★ **HAZARD ALERT:** Flammable solid.
Storage: Inorganic #4; in a Flinn *Saf-Stor*® Can.
Disposal: #26a
Shelf Life: Good if kept dry; store in a Flinn *Chem-Saf*® Bag.
Color: Black
Odor: None



Charcoal, Granular

Coconut — C0202 — 100 g — $ 8.30
activated — C0048 — 500 g — 18.10
8–14 mesh
Animal, bone char — C0361 — 100 g — $11.95
C0049 — 500 g — 25.90

★ **HAZARD ALERT:** Flammable solid.
Storage: Inorganic #4; in a Flinn *Saf-Stor*® Can.
Disposal: #26a
Shelf Life: Good if kept dry; store in a Flinn *Chem-Saf*® Bag.
Color: Gray/black
Odor: None
CAS No. 7440-44-0
Technical Note: Activated charcoal is specially treated to increase internal surface area for high adsorptivity.



See page 37 for a detailed explanation of the Flinn Hazard and Usefulness Code.



Charcoal, Powder

Darco G60® — C0201 — 100 g — $10.65
fine powder — C0047 — 500 g — 21.25

★ **HAZARD ALERT:** Flammable solid
Storage: Inorganic #4; in a Flinn *Saf-Stor*® Can.
Disposal: #26a
Shelf Life: Good if kept dry; store in a Flinn *Chem-Saf*® Bag.
Color: Black
Odor: None
Technical Note: Darco is a trade name for a brand of activated charcoal.



Charcoal, Wood

Lump — C0252 — 500 g — $ 7.95
C0050 — 2 kg — 14.90
Lampblack — C0362 — 100 g — $14.55
very fine powder — C0115 — 500 g — 44.15
Powder — C0130 — 500 g — $13.45
C0131 — 2 kg — 41.55

★ **HAZARD ALERT:** Flammable solid.
Storage: Inorganic #4; in a Flinn *Saf-Stor*® Can.
Disposal: #26a
Shelf Life: Good if kept dry; store in a Flinn *Chem-Saf*® Bag.
Color: Black
Odor: None



China Blue

see Aniline Blue, Water Soluble

China Clay

see Kaolin

Best Reference Books for Your Lab

We recommend that every chemistry laboratory have the following safety and reference books:

- *Merck Index*
- *CRC Handbook of Chemistry and Physics*
- *Prudent Practices in the Laboratory, Handling and Disposal of Chemicals*
- *Flinn Scientific Catalog/Reference Manual*

Chlorine Water

saturated — C0055 — 500 mL — $8.20
(Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Toxic by ingestion or inhalation; strong, pungent odor; avoid contact with organic materials and powdered metals. TLV 1.5 mg/m^3 as elemental chlorine.

Storage: Inorganic #2

Disposal: Allow the chlorine water to stand in an open container **under a hood** in a well-ventilated, protected area. The chlorine will slowly leave the water and the container. The remaining water (now effectively de-gassed) can be put down the drain.

Shelf Life: Whether you buy ready-made chlorine water or make your own (see recipes below) the shelf life of our product or yours would be poor—perhaps six months at best.

Color: Pale Yellow

Odor: Pungent odor like the odor around a swimming pool.

CAS No. for chlorine gas is 7782-50-5

A3

Safety Purchase Suggestion: Prepare this solution as you need it rather than buy it.

FRIENDLY SERVICE GUARANTEED EVERY DAY AT FLINN

Chloroform

reagent
$CHCl_3$ — C0284 — 100 mL — $ 6.50
F.W. 119.38 — C0056 — 500 mL — 13.13

★ **HAZARD ALERT:** A *suspected carcinogen*. Prolonged inhalation may be fatal; toxic and narcotic by inhalation; ingestion may be fatal. Store in a Flinn *Saf-Stor*® Can. LD_{50} 908 mg/kg. TLV 49 mg/m^3.

Storage: Organic #4

Disposal: #27j

Shelf Life: Good if stored properly; keep from sources of light.

Soluble: Slightly in water; miscible with alcohol, ether, benzene, carbon disulfide, carbon tetrachloride.

Color: Clear

Odor: Sweet; anesthesia-like

CAS No. 67-66-3

A4

Incompatibility: Oxidizing agents, acetone, alkalis and alkali metals.

Chlorophenol Red

indicator
pH 5.2 yellow to 6.8 red
$C_{19}H_{12}Cl_2SO_5$ — C0174 — 1 g — $19.20
F.W. 423.26

Storage: Organic #9

Disposal: #26a

Shelf Life: Indefinite

Soluble: Water

Color: Green/brown

Odor: Burnt wood

CAS No. 4430-20-0

D4

Good-Bye to Chlorine and Bromine Water

Disposing of these two solutions is easy. How? Shake the contents of the bottle well. Unscrew the bottle cap and place the bottle under your efficiently operating fume hood. Both chlorine and bromine will vaporize and leave the bottle. Every now and then put the cap back on, shake the bottle and again remove the cap. It does not take long for all the halogen to evaporate. All you are left with is a bottle of water, which can be placed down the drain. How can you tell when all the halogen is gone? The odor is gone! To speed up the process, pour the solution into a shallow glass pan.

Chlorophenol Red Indicator Solution

0.4%, aqueous — *C0337 — 20 mL — $ 5.90
C0176 — 100 mL — 12.25

Storage: Organic #9

Disposal: #26a

Shelf Life: Indefinite

Color: Lilac

Odor: None

D4

*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Chlorophyllin

(Na-K-Cu) chlorophyll — C0178 — 5 g — $28.35

Storage: Organic #9

Disposal: #26a

Shelf Life: Indefinite

Soluble: Many organic solvents

Color: Black

Odor: None

D3

Cholesterol

powder
$C_{27}H_{46}O$ — C0179 — 25 g — $28.50
F.W. 386.67

Storage: Organic #2

Disposal: #26a

Shelf Life: Affected by light

Soluble: Slightly in water; slightly in hot alcohol; soluble in hexane, toluene, and aqueous solution of bile salts.

Color: White

Odor: None

CAS No. 57-88-5

D4

Chrome Alum

see Chromium Potassium Sulfate

Chromerge®

see Cleaner, Anasol® CS 1-9

Chromic Acid

see Chromium Trioxide

Chromium

laboratory grade, chunk
Cr — C0223 — 25 g — $ 8.10
A.W. 52.0 — C0058 — 100 g — 18.90

★ **HAZARD ALERT:** Beware of chrome dust or chrome as a fume—*a known carcinogen.* TLV: 0.5 mg per cubic meter as dust or fume.

Storage: Inorganic #1

Disposal: #27a

Shelf Life: Indefinite

Soluble: Acids (except nitric); strong alkalies; insoluble in water.

Color: Gray

Odor: None

CAS No. 7440-47-3

B4

Chromium (ic) Chloride

chromium(III) chloride
reagent, crystal — C0204 — 25 g — $ 8.60
$CrCl_3 \cdot 6H_2O$ — C0060 — 100 g — 17.05
F.W. 266.48 — C0253 — 500 g — 39.75

★ **HAZARD ALERT:** Slightly toxic; *carcinogen* as dust or fume; severe body tissue irritant; practice strict hygiene in the use of this substance. LD_{50} 1790 mg/kg.

CHROMIUM (IC) CHLORIDE continued on next page.

CHROMIUM (IC) CHLORIDE *continued*

Storage: Inorganic #2
Disposal: #27f
Shelf Life: Fair to poor; deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol; insoluble in ether.
Color: Metallic green/brown
Odor: None
CAS No. 10060-12-5



Chromium Chloride Solution

0.1 Molar
(as $CrCl_3 \cdot 6H_2O$) **C0239** 500 mL **$5.10**

★ **HAZARD ALERT:** Moderately toxic liquid.
Storage: Inorganic #2
Disposal: #27f
Shelf Life: Good
Color: Dark green
Odor: None



Chromium (ic) Nitrate

chromium(III) nitrate
reagent, crystal
$Cr(NO_3)_3 \cdot 9H_2O$ **C0061** 100 g **$11.31**
F.W. 400.18 **C0254** 500 g **28.31**

★ **HAZARD ALERT:** Strong oxidizer; avoid contact with organic materials; slightly toxic by ingestion. LD_{50} 3250 mg/kg.
Storage: Inorganic #3
Disposal: #27f
Shelf Life: Poor; substance very deliquescent.
Soluble: Water and alcohol
Color: Metallic gray/black
Odor: None
CAS No. 7789-02-8



Chromium Nitrate, Gramolpak

0.1 Molar
(as $Cr(NO_3)_3 \cdot 9H_2O$) * **C0390** pkg. **$5.90**

For hazard alert, storage, disposal, etc., see Chromium Nitrate, C0061.
*Gramolpak® is a unique package which makes 500 mL with distilled water.





Chromium Nitrate Solution

0.1 Molar
(as $Cr(NO_3)_3 \cdot 9H_2O$) **C0379** 500 mL **$10.50**
Storage: Inorganic #3
Disposal: #27f
Shelf Life: Indefinite
Color: Gray
Odor: None



Flinn Gramolpaks® make solution preparation easy.

Chromium Oxide

chromium(III) oxide, chromic oxide, chromium sesquioxide
reagent
Cr_2O_3 **C0363** 25 g **$5.75**
F.W. 152.02 **C0224** 100 g **9.85**

★ **HAZARD ALERT:** Body tissue irritant.
Storage: Inorganic #4 inside a Flinn *Chem-Saf*® Bag.
Disposal: #26a
Shelf Life: Indefinite
Soluble: Insoluble in water, acids or alkalies.
Color: Light green
Odor: None
CAS No. 1308-38-9



Chromium (ic) Potassium Sulfate

chromium(III) potassium sulfate, chrome alum
reagent, crystal
$CrK(SO_4)_2 \cdot 12H_2O$ **C0364** 25 g **$ 7.45**
F.W. 499.43 **C0205** 100 g **17.15**

★ **HAZARD ALERT:** Body tissue irritant.
Storage: Inorganic #2
Disposal: #27f
Shelf Life: Fair to poor; substance efflorescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: Metallic purple
Odor: None
CAS No. 7788-99-0



HOW TO...

Prepare Saturated Chlorine Water Solution

One of three methods may be used to prepare saturated chlorine water solution. Carry out all reactions and work with the chlorine water under a fume hood.

1. Very slowly bubble chlorine gas from a chlorine gas cylinder or lecture bottle into the required quantity of distilled water. Perform this process only under a fume hood.
2. Consider setting up a chlorine gas generator from apparatus and chemicals in your school stores facility. You will need a long stem funnel and a delivery tube assembled into a two-hole stopper which will fit into a 250 mL Erlenmeyer or flat bottom flask. Place approximately 10 grams of manganese dioxide (MnO_2) (Flinn Catalog numbers M0023, M0024, M0025, M0026) into the flask. Now slowly add approximately 40 mL of hydrochloric acid (Flinn Catalog numbers H0031, H0004, H0005, H0006) and warm very slightly. This process should produce about a liter or more of chlorine water and must be performed under a fume hood.
3. Mix 100 mL of commercial bleach (like Clorox®) with 25 mL of 6 molar hydrochloric acid (Flinn Catalog number H0033) and then dilute to one liter with distilled water. The solution will have a characteristic yellow/green color but strongly on the green side. Do not close the container in which you prepare the solution since a great deal of chlorine is formed. Allow the solution to stand for a short period until it is stable. If the bleach you use is very fresh it may take days before the solution stops bubbling. Only when the bubbling stops can you cap it. You can be sure such a solution is saturated. If, at some later time, you are not sure it is still saturated, then either make fresh solution or add some bleach to your old solution. The wise option would be to make a fresh solution.

Safety Suggestion: Prepare the option you select only under a fume hood. Package only in glass containers with a cap that has a plastic cap liner.

Label the material as follows: *Solution causes severe burns. Avoid contact with skin, eyes or clothing. Avoid breathing vapors. Do not pipet by mouth. Wash areas of contact with copious quantities of water.*

Chromium (ic) Sulfate

chromium(III) sulfate
reagent, crystal — C0365 — 25 g — $ 9.25
$Cr_2(SO_4)_3 \cdot 15H_2O$ — C0063 — 100 g — 21.90
F.W. 662.39 — C0255 — 500 g — 69.30

★ **HAZARD ALERT:** Body tissue irritant.
Storage: Inorganic #2
Disposal: #27f
Shelf Life: Indefinite
Soluble: Water
Color: Light green
Odor: None
CAS No. 10101-53-8



Chromium Trioxide

chromium(VI) oxide, chromic acid
laboratory grade
CrO_3 — C0206 — 100 g — $15.93
F.W. 100.01

★ **HAZARD ALERT:** Corrosive to skin; *highly* toxic; powerful oxidizing agent; avoid contact with reducing agents and organic material. A *carcinogen* as fume or dust. Practice strict hygiene in the use of this substance. LD_{50} 80 mg/kg.
Storage: Inorganic #4; store in Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can.
Disposal: #12a
Shelf Life: Poor; product deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; alcohol and mineral acids.
Color: Rose/red
Odor: None
CAS No. 1333-82-0
Incompatibility: Reducing agents or organics; violent reaction possible.



Chy-Max™

chymosin, enzyme coagulant
for cheese-making
powder — C0419 — 5 g — $10.10

Storage: Miscellaneous, nonhazardous organic material.
Disposal: #26a
Shelf Life: Good if stored properly. Store in a cool (<10 °C) and dry place in a closed container.
Soluble: Water
Color: Buff
Odor: Malty



Technical Note: Suitable for cheese-making demonstrations and experiments. Prepare solutions fresh: dissolve 0.3 g Chy-Max in 100 mL of bottled water. Use one drop of solution per 10-mL sample size of milk. Two grams of C0419 should be enough to coagulate more than 100 L of milk!

Cinnamaldehyde

$C_6H_5CH{=}CHCHO$ — C0400 — 100 mL — $9.40
F.W. 132.16

★ **HAZARD ALERT:** Body tissue irritant; combustible. LD_{50} 2220 mg/kg.

Continued on next column.

Emergencies and Panic

"Do not panic!" Easy to say but hard to do during an emergency. A good policy to prepare for emergencies is to simulate the event and practice what should be done. If you have never used a hand-held fire extinguisher in an emergency, is the time to learn when a fire erupts? Certainly not! Practice and planning may eliminate panic.

CINNAMALDEHYDE *continued*

Storage: Organic #3
Disposal: #2
Shelf Life: Fair; protect from light; keep tightly closed.
Soluble: Alcohol
Color: Pale yellow
Odor: Cinnamon
CAS No. 14371-10-9



Citric Acid

monohydrate
reagent, crystal
$C_6H_8O_7 \cdot H_2O$ — C0231 — 100 g — $ 4.55
F.W. 210.15 — C0065 — 500 g — 14.75

★ **HAZARD ALERT:** Severe eye irritant.
Storage: Organic #1
Disposal: #26a
Shelf Life: Substance efflorescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, alcohol and ether
Color: White
Odor: None
CAS No. 5949-29-1



Safety Purchase Suggestion

Citric acid is a great base neutralizer. Please see page 917 for *E-Z Pour Base Neutralizer*.

Citric Acid

anhydrous
laboratory grade, powder
$C_6H_8O_7$ — C0135 — 100 g — $ 6.95
F.W. 192.13 — C0136 — 500 g — 11.10

For storage, disposal, etc., see Citric Acid, C0231.
Color: White
Odor: None
CAS No. 77-92-9



Citric Acid, Trisodium Salt

see Sodium Citrate

Clay

see Kaolin

Clayton Yellow

indicator
pH 11.0 yellow to 13.0 red
$C_{28}H_{19}N_5Na_2O_6S_4$ — C0366 — 10 g — $14.45
F.W. 695.73

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Tan/yellow
Odor: None
CAS No. 1829-00-1
C.I. #19540



Clayton Yellow Indicator Solution

1%, aqueous
* C0336 — 20 mL — $3.90

For storage, disposal, etc.
see Clayton Yellow, C0366.
Color: Yellow
Odor: None



*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Cleaner, Alconox®

powder
general purpose laboratory detergent

A0126	4 lb.	$ 21.40
A0127	25 lb.	111.85

Storage: Washing area.
Disposal: Dilute and place down the drain.
Shelf Life: Indefinite if kept dry.
Soluble: Water
Color: White
Odor: Slight chlorine odor





Cleaner, Anasol® CS 1-9

chromate acid glassware cleaner
contains: chromium(VI) oxide and water

C0053	1 pkg.	$25.00

★ **HAZARD ALERT:** Very corrosive substance; in concentrated form it should be treated as sulfuric acid. Highly toxic; powerful oxidizing agent; *known carcinogen.*
Storage: Inorganic #9 in a dedicated acid cabinet. If an acid cabinet is not available, then store in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can.
Disposal: #27f
Shelf Life: Excellent if stored safely.
Soluble: Water



Technical Note: This is a concentrate. Mix 1 × 25 mL with 5 pints of concentrated sulfuric acid. Acid should be ordered separately. Mixture will yield 5 pints of cleaning liquid that can be used repeatedly. It turns green upon expiration. This is a very strong, corrosive, heat-generating cleaner. Use a cleaner like this only for the most stubborn, soiled labware.

Cleaner, Dishwashing

household liquid dishwashing detergent

C0241	22 oz. dispenser bottle	$5.65

Storage: In washing area
Disposal: Dilute with water and place down the drain.
Shelf Life: Indefinite
Soluble: Water
Color: Pink
Odor: Floral



Cleaner, Flinn-It®

for carbon residues
Specifically for hard-to-handle baked or heated on blackened residues, e.g., porcelain crucibles.

C0367	470 mL	$8.10

★ **HAZARD ALERT:** Contains very strong base. Wear gloves, chemical splash goggles and other protective gear normally used in handling a very strong base.
Storage: Inorganic #4
Shelf Life: Good if stored safely.
Soluble: Water
Color: Buff
Odor: Soap-like



Technical Note: Avoid prolonged contact with glassware. The solution will etch glassware after prolonged exposure. This cleaning liquid is specifically designed for carbonaceous residue. There are some residues that resist all cleaners. If this cleaner does not remove the residue, it cannot be removed.
Storage Note: If cleaner liquefies upon storage (especially under hot and humid conditions), place the container in a refrigerator for a few hours. The material will return to its "toothpaste-like" consistency.

Cleaner, Liqui-Nox®

General purpose liquid laboratory detergent
phosphate free

L0045	1 qt.	$13.35
L0046	1 gal.	44.10

Storage: Washing area
Disposal: Dilute with water and place down the drain.
Shelf Life: Indefinite
Soluble: Water
Color: Yellow
Odor: None



Cleaner, RBS 35®

concentrate

C0054	quart	$75.00

★ **HAZARD ALERT:** An alkaline solution; avoid eye contact and prolonged skin exposure.
Storage: With other cleaning materials.
Disposal: Dilute and place down the drain.
Shelf Life: Excellent
Soluble: Water
Color: Milk white
Odor: None



Technical Note: Super strength liquid cleaning agent for glass, porcelain and plastics. Simply dilute the concentrate to a strength that suits your laboratory cleaning problem. A 50 times dilution (20 mL per liter) solves most cleaning problems. While the product is expensive, a little goes a long way.

Cleaner, Simple Green®

general purpose liquid cleaner, phosphate-free, biodegradable; degreaser

C0405	16 oz.	$8.50

Storage: Washing area
Disposal: Dilute with water and place down the drain.
Shelf Life: Indefinite
Soluble: Water
Color: Clear green
Odor: Sassafras



Clove Oil

eugenol

C0066	25 mL	$22.85
	(Packaged in PVC-coated bottles)	

★ **HAZARD ALERT:** Slightly toxic. LD_{50} 2650 mg/kg.
Storage: Organic #8
Disposal: #26a
Shelf Life: Indefinite
Soluble: Alcohol; not water.
Color: Very slight amber
Odor: Clove
CAS No. 8000-34-8



Technical Note: Used for histological clearing.

Cleaning and Scratching Glassware

Scratches are a real enemy of glass. Why? A scratch causes a stress point in the glass around which a break will occur. Have you ever watched glass being cut? The first thing done is to scratch or scribe the glass. Pressure is placed on the scratched line and a clean break occurs. If you can clean glassware without using wire brushes that may scratch—great. The sooner dirty labware is washed the easier it is to clean. Use FLINN-IT® (found on this page) for the tough-to-clean job.

Cobalt

laboratory grade, pieces

Co	C0067	25 g	$14.50
A.W. 58.93	C0068	100 g	39.90

★ **HAZARD ALERT:** *Possible carcinogen* as fume or dust. TLV 0.01 mg/m^3 as dust or fume.

Storage: Inorganic #1

Disposal: #26a

Shelf Life: Indefinite

Soluble: Nitric acid

Color: Silver/brown

Odor: None

CAS No. 7440-48-4



Cobalt Carbonate

cobaltous carbonate, basic
reagent, powder
$2CoCO_3 \cdot 3Co(OH)_2 \cdot xH_2O$ C0272 25 g $27.20

★ **HAZARD ALERT:** Cobalt compounds are *possible carcinogens*; moderately toxic. LD_{50} 640 mg/kg.

Storage: Inorganic #4

Disposal: #27f

Shelf Life: Indefinite

Soluble: Acids; insoluble in cold water, decomposes in hot water.

Color: Light purple

Odor: None

CAS No. 5137-79-1



Cobalt(ous) Chloride

cobalt(II) chloride
crystal
$CoCl_2 \cdot 6H_2O$
F.W. 237.95

Reagent	C0225	25 g	$ 8.55
	C0069	100 g	12.85
	C0070	500 g	33.80
Laboratory grade	C0411	100 g	11.50

★ **HAZARD ALERT:** Moderately toxic by ingestion; causes blood damage; *possible carcinogen* as fume or dust. Practice strict hygiene in the use of this substance. LD_{50} 766 mg/kg.

Storage: Inorganic #2

Disposal: #27f

Shelf Life: Hygroscopic; keep tightly closed. Good if stored properly.

Soluble: Water, alcohol and acetone

Color: Red/violet

Odor: None

CAS No. 7791-13-1



Cobalt(ous) Chloride, Gramolpak

0.1 Molar
(as $CoCl_2 \cdot 6H_2O$) * C0392 pkg. $7.20

For hazard alert, storage, disposal, etc., see Cobalt(ous) Chloride, C0225.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Should We Ban All Carcinogenic Chemicals from the Lab?

No! Carcinogens cause cancer with repeat exposures over a long period of time. Many chromium, cobalt, and nickel salts are carcinogens as a fume or dust. How often do you use these chemicals and how often do you or your students inhale their dusts or fumes? Almost never! Yes, you do want to limit your exposure to volatile organics that are carcinogens such as benzene and formaldehyde. These materials need to be stored properly and used in a hood to reduce the exposure levels. Know the substance and how it can hurt you. Don't be chemophobic!

Cobalt(ous) Chloride Solution

0.1 Molar
(as $CoCl_2 \cdot 6H_2O$) C0242 500 mL $5.95

For hazard alert, storage, disposal, etc., see Cobalt(ous) Chloride, C0225.

Color: Pink

Odor: None



Cobalt Chloride, Test Paper

see Test Papers on page 294

Cobalt(ous) Nitrate

cobalt(II) nitrate
crystal
$Co(NO_3)_2 \cdot 6H_2O$
F.W. 291.05

Reagent	C0207	25 g	$ 8.20
	C0071	100 g	15.91
	C0072	500 g	36.91
Laboratory grade	C0412	100 g	12.91
	C0413	500 g	31.91

★ **HAZARD ALERT:** Oxidizer; fire risk in contact with organic material; moderately toxic; *possible carcinogen*. LD_{50} 691 mg/kg.

Storage: Inorganic #3

Disposal: #27f

Shelf Life: Poor; substance deliquescent; store in a Flinn *Chem-Saf*® Bag.

Soluble: Most organic solvents

Color: Brown/orange

Odor: None

CAS No. 10026-22-9



Cobalt(ous) Nitrate Solution

0.1 Molar
(as $Co(NO_3)_2 \cdot 6H_2O$) C0243 500 mL $6.15

For hazard alert, storage, disposal, etc., see Cobalt(ous) Nitrate, C0207.

Color: Pink

Odor: None



Cobalt(ic) Oxide

cobalt (II, III) oxide
laboratory grade, powder

Co_3O_4	C0219	25 g	$10.35
F.W. 240.80	C0220	100 g	35.70

★ **HAZARD ALERT:** *Possible carcinogen*; slightly toxic. LD_{50} 5 g/kg.

Storage: Inorganic #4

Disposal: #26a

Shelf Life: Indefinite

Soluble: Sulfuric acid: insoluble in water.

Color: Black

Odor: None

CAS No. 1308-06-1



Cobalt(ous) Sulfate

cobalt(II) sulfate

reagent, crystal	C0208	25 g	$ 6.60
$CoSO_4 \cdot 7H_2O$	C0073	100 g	14.95
F.W. 281.12	C0275	500 g	42.45

★ **HAZARD ALERT:** Eye, skin and respiratory irritant; *possible carcinogen*; moderately toxic. LD_{50} 768 mg/kg.

Storage: Inorganic #2

Disposal: #27f

Shelf Life: Indefinite

Soluble: Water

Color: Red-pink

Odor: None

CAS No. 10026-24-1



Coconut Oil

C0074 100 mL $8.55

Storage: Organic #3
Disposal: #26a
Shelf Life: Keep tightly closed; can develop mold; store in a Flinn *Chem-Saf*® Bag.
Soluble: Not miscible with water; soluble in many organic solvents.
Color: Buff
Odor: None
CAS No. 8001-31-8

D4

Colchicine

laboratory grade, powder
$C_{22}H_{25}NO_6$
F.W. 399.43

C0407 100 mg $28.45
C0076 500 mg 53.40

★ **HAZARD ALERT:** Highly toxic; as little as 0.02 grams could be fatal. LD_{50} 6 mg/kg.
Storage: Organic #2 inside a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can and then securely locked up in a cabinet dedicated to poison storage.
Disposal: #18b
Shelf Life: Indefinite if stored away from light.
Soluble: Water, alcohol and chloroform.
Color: White
Odor: None
CAS No. 64-86-8

A3

Safety Purchase Suggestion: Avoid this material on school premises unless you practice strict hygiene.

Cold Pack, Instant

NEW!

consumer first-aid product for thermochemistry demonstrations
contains: ammonium nitrate and water in separate compartments; activated by crushing

AP6267 $2.55

★ **HAZARD ALERT:** The cold pack solid is slightly toxic by ingestion and is a body tissue irritant.
Storage: Miscellaneous inorganic or Inorganic #8
Disposal: #26b
Shelf Life: Indefinite

D3

Congo Red

biological stain/indicator
pH 3.0 blue to 5.0 red
$C_{32}H_{22}N_6Na_2O_6S_2$
F.W. 696.67

C0120 10 g $10.75

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Dark brown
Odor: None
CAS No. 573-58-0
C.I. #22120

D3

Congo Red Indicator Solution

0.10%, aqueous

C0127 100 mL $ 4.25
C0128 500 mL 11.25

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Orange/red
Odor: None

D4

Copper, Foil

Cu
A.W. 63.55
.005″ thick

C0137 100 g $ 6.85
(100 g = approx. 1 sq. foot)
C0138 500 g 19.95
(500 g = approx. 55″ long × 12″ wide)

Storage: Inorganic #1
Disposal: #26a
Shelf Life: Indefinite
Color: Copper
Odor: None
CAS No. 7440-50-8

D3



Forms of Copper C0081, C0182, C0083, C0088

Copper, Granular

20 mesh and smaller

C0081 100 g $ 5.60
C0082 500 g 20.10

For storage, disposal, etc., see Copper, Foil, C0137.

D3

Copper, Powder

C0086 100 g $ 6.85
C0087 500 g 21.65

★ **HAZARD ALERT:** Metals, in fine powder form, always present a serious fire and explosion risk. TLV 1 mg/m^3 as dust or fume.
For storage, disposal, etc., see Copper Foil, C0137.

C4

Copper, Sheet

#22 gauge
0.025″ thick

C0369 $11.35
Each piece 6″ × 12″
Weight: approx. 223 grams
C0079 21.10
Each piece 12″ × 12″
Weight: approx. 445 grams

#30 gauge
0.010″ thick

C0370 9.35
Each piece 6″ × 12″
Weight: approx. 125 grams
C0080 12.95
Each piece 12″ × 12″
Weight: approx. 250 grams

For storage, disposal, etc., see Copper, Foil, C0137.

D3

Don't Do It!

Don't transfer a chemical to another package unless you know that package will tolerate the product. Oh yes, we agree, glass is always a good choice. Glass may be your best choice. Be careful about the cap you choose. The cap liner may not tolerate the substance. Best course of action—avoid transferring a substance from its original container.

Copper, Shot

3–14 mesh — C0083 100 g $ 5.95; C0084 500 g 13.90

For storage, disposal, etc., see Copper, Foil, C0137.



Copper, Strips

1.2 × 15 cm — C0182 pkg./6 strips $7.45

For storage, disposal, etc., see Copper, Foil, C0137.



Copper, Turnings, Light

1–2 mm width

C0088 100 g $ 8.75; C0089 500 g 23.90

For storage, disposal, etc., see Copper, Foil, C0137.



Copper, Wire, Bare

16 gauge 1.3 mm thick (128 ft/lb) — C0146 4 oz. $ 3.90; C0147 1 pound 9.65

18 gauge 1.0 mm thick (203 ft/lb) — C0148 4 oz. 4.05; C0149 1 pound 8.95

22 gauge 0.6 mm thick (516 ft/lb) — C0150 4 oz. 4.70; C0151 1 pound 12.25

For storage, disposal, etc., see Copper, Foil, C0137.



Copper Compounds

see Cupric [Copper (II)] or Cuprous [Copper (I)]

Cornmeal Agar

bacteriological culture media — C0408 50 g $19.90

Storage: With culture media.
Disposal: #26a
Shelf Life: Good if kept dry.
Soluble: Water
Color: Amber
Odor: Slight corn



Corn Oil

C0090 500 mL $4.05

Storage: Organic #3
Disposal: #26a
Shelf Life: Indefinite
Soluble: Organic solvents; slightly in alcohol; not water.
Color: Amber
Odor: None
CAS No. 8001-30-7



Shelf Life of Chemicals

The safe shelf life of chemicals varies from product to product. Some, like potassium metal and ether, can become potentially more dangerous. Others may become less chemically active. If you sometimes wonder why an experiment did not work, the chemical could be the problem. Review the shelf life information provided in this Catalog/Reference Manual. Purchase particularly hazardous chemicals in small quantities so that they are completely used up in a short time—preferably in less than a year.

Corn Syrup

dextrose syrup, Karo® syrup — C0091 500 mL $4.20

Storage: Organic #2
Disposal: #26b
Shelf Life: Fair to good
Soluble: Water; slightly in alcohol.
Color: Colorless
Odor: None
CAS No. 50-99-7 as Dextrose



Cotton, Paper Wrapped, Roll



Catalog No.	Description Absorbent/Nonabsorbent	Type Sterile/Nonsterile	Pkg. Size	Price
C0153	Absorbent	Nonsterile	1 pound	$10.30
C0338	Absorbent	Sterile	¼ pound	6.55
C0339	Absorbent	Sterile	1 pound	19.10
C0340	Nonabsorbent	Nonsterile	1 pound	11.55

Cotton Cord

dental cotton, rolled
each roll 6″ long × ⅜″ diameter — C0232 6-roll pkg. $5.40

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Color: White
Odor: None



Cotton Thread

600 feet/spool — C0221 spool $3.55

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Color: White
Odor: None



Cottonseed Oil

C0092 500 mL $ 8.50; C0276 4 liters 49.90

Storage: Organic #3
Disposal: #26a
Shelf Life: Indefinite
Soluble: Slightly in alcohol; soluble in many common organic solvents.
Color: Amber
Odor: None
CAS No. 8001-29-4



Craftcast

see Polyurethane Foam System

Cream of Tartar

see Potassium Bitartrate

Creatinine

amino acid/protein metabolite, crystal
$C_4H_7N_3O$
F.W. 113.12 — C0183 10 g $33.45

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 60-27-5



m-Cresol Purple

indicator, sodium salt
pH 1.2 red to 2.8 yellow and
7.4 yellow to 9.0 purple
$C_{21}H_{17}NaO_5S$ **C0184** 1 g **$22.05**
F.W. 404.42

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Shiny black
Odor: None
CAS No. 62625-31-4



m-Cresol Purple Indicator Solution

0.04%, aqueous
* **C0371** 20 mL **$6.10**

For storage, disposal, etc.
see m-Cresol Purple, C0184.
Color: Purple/blue
Odor: None
Technical Note: Contains 10% 0.1M sodium hydroxide.



*Special and unique dropping bottle package called a Flinn *E-Z Drop®*.

Cresol

Saponated, see Lysol®

Cresol Red

indicator, sodium salt
pH 2.0 orange to 3.0 amber and
7.2 yellow to 8.8 red
$C_{21}H_{17}NaO_5S$ **C0123** 1 g **$14.05**
F.W. 404.42

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Dark brown
Odor: Burnt wood
CAS No. 62625-29-0



Cresol Red Indicator Solution

0.02%, aqueous
C0209 100 mL **$ 7.70**
C0186 500 mL **22.45**

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Orange
Odor: None



Crystal Violet

gentian violet
indicator/biological stain
pH 0.0 yellow to 1.8 violet-blue
reagent
$C_{25}H_{30}ClN_3$ **C0280** 1 g **$5.05**
F.W. 408.00 **C0124** 5 g **7.60**
C0125 10 g **9.15**

★ **HAZARD ALERT:** Moderately toxic by ingestion; body tissue irritant. LD_{50} 420 mg/kg.
Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Pea green
Odor: Musty
CAS No. 548-62-9
C.I. #42555



Crystal Violet Solution

1%, Alcoholic **C0132** 100 mL **$ 6.75**
C0133 500 mL **13.15**
(Both package sizes packaged in PVC-coated bottles)

Hucker formula **C0188** 100 mL **$ 9.90**
for Gram staining **C0189** 500 mL **19.95**
(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Flammable liquid.
Storage: Organic #9 in a dedicated flammables cabinet; if one is not available store in a Flinn *Saf-Stor®* Can.
Disposal: #26b
Shelf Life: Good, if stored safely.
Color: Blue/violet
Odor: Alcohol
Technical Note: Hucker formula contains crystal violet, ammonium oxalate and ethyl alcohol and is commonly used for Gram staining procedures.



Culture Media

These substances are also listed individually and in alphabetical order throughout the chemical section of this Catalog/Reference Manual.

Agar, Bacteriological	**A0257**	25 g	**$10.25**
	A0084	100 g	**17.95**
	A0085	500 g	**54.50**
Blood Agar Base	**B0191**	100 g	**$34.60**
Cornmeal Agar	**C0408**	50 g	**$19.90**
Dextrose Agar	**D0049**	100 g	**$35.50**
EMB Agar	**E0021**	100 g	**$37.25**
MacConkey Agar	**M0209**	100 g	**$29.30**
Mueller Hinton Agar	**M0203**	100 g	**$31.35**
Nutrient Agar	**N0019**	100 g	**$27.60**
	N0020	500 g	**71.95**
Nutrient Broth	**N0021**	100 g	**$31.10**
	N0022	500 g	**84.25**
Potato Dextrose Agar	**P0098**	100 g	**$30.55**
	P0099	500 g	**89.25**
Sabouraud Dextrose Agar	**S0337**	100 g	**$18.85**
Thioglycolate Medium	**T0093**	100 g	**$24.50**

Culture Media

Commercial culture media (such as those listed in this Catalog/Reference Manual) or media that teachers prepare themselves is intended to enable the rapid and rich growth of microorganisms. If prepared culture dishes are not handled and stored in a fastidious manner, undesirable and even pathogenic culture growth is possible. Good housekeeping and proper disposal are a must for these materials. See the Flinn Biology Disposal article on pages 1006–1007 for more information.

Culture Media Ingredients

Agar			
	A0256	25 g	**$ 6.75**
	A0012	100 g	**12.80**
	A0013	500 g	**45.35**
Beef Extract			
	B0127	25 g	**$12.35**
	B0037	100 g	**37.65**
Bile Salts			
	B0186	10 g	**$ 4.55**
	B0133	25 g	**7.65**
	B0038	100 g	**17.40**
Bouillon Cubes			
	B0190	pkg./6	**$ 3.45**
Gelatin			
	G0037	150 g	**$ 7.15**
	G0004	500 g	**13.95**
Pancreatin			
	P0001	25 g	**$ 5.80**
	P0002	100 g	**9.85**
Pepsin			
	P0006	25 g	**$ 7.70**
	P0007	100 g	**14.45**
Peptone			
	P0008	25 g	**$ 6.75**
	P0009	100 g	**9.30**
	P0010	500 g	**36.35**
Rennin			
	R0011	10 g	**$21.55**
	R0001	25 g	**33.90**
Tryptone			
	T0026	100 g	**$33.15**

Culture Media, Prepared

see pages 641–642 for a complete listing of all prepared culture media

Cupric ... Copper(II) ...
Copper compounds in which the copper has an ionic charge or oxidation number of two.

Cupric Acetate

copper(II) acetate
laboratory grade, crystal
$(CH_3CO_2)_2Cu \bullet H_2O$
F.W. 199.65

C0279	25 g	**$ 8.05**
C0093	100 g	**16.70**

★ **HAZARD ALERT:** Moderately toxic. LD_{50} 710 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water, alcohol and ether
Color: Blue/green
Odor: None
CAS No. 6046-93-1



Safety Simulations

Practice emergency situations to discover whether your plan will work. You may be surprised at the weak points of your plan. If you don't have plans for fire, eye emergency, poison ingestion, etc.—then such plans should be developed. Nothing complicated is needed. Simply a "what will we do" response. Teachers regularly tell us they wish they had tested their plan before the event happened. Simulate an emergency and then implement your plan. Practice will reveal weak points.

Cupric Bromide

copper(II) bromide
laboratory grade, crystal
$CuBr_2$
F.W. 223.37

C0210	25 g	**$10.45**
C0094	100 g	**26.10**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; hygroscopic.
Soluble: Water, alcohol, acetone
Color: Aluminum/black
Odor: Bromine-like
CAS No. 7789-45-9



Cupric Carbonate

copper(II) carbonate
laboratory grade, powder
$Cu_2(OH)_2CO_3$
F.W. 221.11

C0211	100 g	**$ 6.95**
C0095	500 g	**14.95**

★ **HAZARD ALERT:** Slightly toxic by ingestion and inhalation. LD_{50} 1350 mg/kg.
Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Acids; not in water
Color: Light blue/green
Odor: None
CAS No. 12069-69-1



Cupric Chloride

copper(II) chloride, dihydrate
crystal
$CuCl_2 \bullet 2H_2O$
F.W. 170.49

Reagent	**C0212**	25 g	**$ 6.80**
	C0096	100 g	**9.41**
	C0097	500 g	**33.11**
Laboratory grade	**C0281**	100 g	**$ 5.01**
	C0161	500 g	**12.71**
	C0162	2 kg	**44.81**

★ **HAZARD ALERT:** Highly toxic by ingestion and inhalation. LD_{50} 140 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; substance deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: Light blue/green
Odor: None
CAS No. 10125-13-0



Cupric Chloride

copper(II) chloride, anhydrous
laboratory grade, powder
$CuCl_2$
F.W. 134.45

C0282	25 g	**$ 9.30**
C0227	100 g	**10.80**

For hazard alert, storage, disposal, etc., see Cupric Chloride, C0212.
Color: Light brown
Odor: Slight vanilla
CAS No. 7447-39-4



Cupric Chloride, Gramolpak

0.1 Molar
(as $CuCl_2 \bullet 2H_2O$) * **C0395** pkg. **$5.95**

For hazard alert, storage, disposal, etc., see Cupric Chloride, C0212.
*Gramolpak® is a unique package which makes 1 liter with distilled water.





Cupric Chloride Solution

(as $CuCl_2 \cdot 2H_2O$)

0.5 Molar	**C0381**	500 mL	**$8.15**
0.1 Molar	**C0382**	500 mL	**6.65**

★ **HAZARD ALERT:** Toxic if ingested.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Light blue/green
Odor: None



Cupric Nitrate

copper(II) nitrate
crystal
$Cu(NO_3)_2 \cdot 3H_2O$
F.W. 241.60

Reagent	**C0213**	25 g	**$ 6.60**
	C0098	100 g	**11.31**
	C0099	500 g	**32.31**
Laboratory grade	**C0414**	100 g	**$11.11**
	C0415	500 g	**19.21**

★ **HAZARD ALERT:** Oxidizing material; dangerous in contact with organic material; moderately toxic. LD_{50} 940 mg/kg.
Storage: Inorganic #3
Disposal: #26a
Shelf Life: Poor; substance deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: Royal blue
Odor: Slight nitric acid
CAS No. 19004-19-4





Forms of Cupric Sulfate C0102, C0105, C0246, C0373

Cupric Nitrate, Gramolpak

(as $Cu(NO_3)_2 \cdot 3H_2O$)

0.1 Molar†	* **C0396**	pkg. (Makes 1 liter)	**$5.50**
0.25 Molar§	* **C0397**	pkg. (Makes 500 mL)	**7.55**

For hazard alert, storage, disposal, etc. see Cupric Nitrate, C0213.

*Gramolpak® is a unique package which makes a known solution with distilled water.



Cupric Nitrate Solution

(as $Cu(NO_3)_2 \cdot 3H_2O$)

0.5 Molar	**C0244**	500 mL	**$6.65**
0.1 Molar	**C0245**	500 mL	**4.45**

★ **HAZARD ALERT:** Moderately toxic.
Storage: Inorganic #3
Disposal: #26b
Shelf Life: Good
Color: Blue
Odor: None



Cupric Oxide

copper(II) oxide
reagent
CuO
F.W. 79.54

Powder	**C0399**	25 g	**$ 6.40**
	C0100	100 g	**12.85**
	C0101	500 g	**23.85**
Wire form	**C0283**	10 g	**$12.75**
¼–½ mm ×	**C0214**	25 g	**19.25**
5 mm	**C0152**	100 g	**60.85**

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Acids; only with difficulty in water.
Color: Gray/black
Odor: None
CAS No. 1317-38-0



Cupric Subcarbonate

see Cupric Carbonate

Cupric Sulfate

copper(II) sulfate, pentahydrate
$CuSO_4 \cdot 5H_2O$
F.W. 249.69

Reagent	**C0102**	100 g	**$ 7.80**
crystal, fine	**C0103**	500 g	**17.50**
	C0104	2 kg	**53.60**
Laboratory grade	**C0105**	500 g	**$ 7.45**
crystal, medium	**C0106**	2 kg	**18.95**
Approx. ¼" to ½" dia.	**C0277**	12 kg	**82.85**
Laboratory grade	**C0373**	500 g	**$ 8.75**
crystal, large	**C0374**	2 kg	**19.90**
Approx. ½" to ¾" dia.			
Laboratory grade	**C0110**	500 g	**$ 6.55**
powder	**C0111**	2 kg	**18.20**

★ **HAZARD ALERT:** Skin and respiratory irritant; moderately toxic by ingestion and inhalation. LD_{50} 300 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair, slowly effloresces in the air; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and methanol; slightly in alcohol and glycerol.
Color: Blue/white
Odor: None
CAS No. 7758-99-8



Cupric Sulfate

copper(II) sulfate, anhydrous

reagent, powder	**C0215**	25 g	**$ 7.00**
$CuSO_4$	**C0107**	100 g	**15.10**
F.W. 159.61	**C0108**	500 g	**42.95**

For hazard alert, storage, disposal, etc., see Cupric Sulfate, C0102.
Color: Off-white
Odor: None
CAS No. 7758-98-7



Crystal Danger

Many popular crystal-growing activities utilize cupric sulfate to produce beautiful, large, and colorful crystals. While these are wonderful activities to teach students the art and science of growing crystals, they do have a hidden danger if students are allowed to handle the crystals or take them home. Cupric sulfate is toxic—300 mg/kg. Do not allow students to take these crystals home!

Cupric Sulfate, Gramolpak

0.10 Molar
(as $CuSO_4 \cdot 5H_2O$) *** C0398** pkg. **$5.65**

For hazard alert, storage, disposal, etc., see Cupric Sulfate, C0102.

*Gramolpak® is a unique package which makes 1 liter with distilled water and 3 drops of concentrated sulfuric acid (Flinn Catalog Number S0228).





Cupric Sulfate Solution

(as $CuSO_4 \cdot 5H_2O$)

1 Molar	**C0246**	500 mL	**$6.35**
0.1 Molar	**C0247**	500 mL	**4.90**
0.01 Molar	**C0248**	500 mL	**4.45**

★ **HAZARD ALERT:** Slightly toxic by ingestion.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Blue/green
Odor: None



Cuprous... Copper(I)...
Copper compounds in which the copper has an ionic charge or oxidation number of one.

Cupric Sulfate Stock Solution

20%
for preparing any strength of solution for determining specific gravity of blood and plasma
specific gravity: 1.100 20/20 °C
C0156 500 mL **$11.25**

★ **HAZARD ALERT:** Slightly toxic by ingestion.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Blue
Odor: None



Cupric Sulfate Electrolyte Solution

contains copper(II) sulfate and sulfuric acid
C0249 500 mL **$7.85**

★ **HAZARD ALERT:** Toxic; corrosive; acid solution.
Storage: Inorganic #2
Disposal: #24b
Shelf Life: Good
Color: Blue
Odor: None
Technical Note: Suitable for copper electroplating experiments and demonstrations.



Invisible Gloves
Wear chemical-resistant gloves whenever working with hazardous substances. Consider applying a generous amount of hand lotion to your hands just before donning the gloves. The lotion acts as a barrier to corrosive or defatting organic solvents. Gloves sometimes develop leaks and your invisible gloves may be a second line of defense.

Cuprous Chloride

copper(I) chloride
powder
CuCl
F.W. 98.99

Reagent	**C0216**	25 g	**$12.45**
	C0129	100 g	**37.60**
Laboratory grade	**C0112**	100 g	**$ 9.25**
	C0134	500 g	**21.65**

★ **HAZARD ALERT:** Toxic; eye, skin and respiratory tract irritant. LD_{50} 140 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair; changes on exposure to air and light. Store in a Flinn *Chem-Saf*® Bag.
Soluble: Acids, ammonia and ether; slightly in water; insoluble in alcohol and acetone.
Color: Pea green
Odor: None
CAS No. 7758-89-6



Cuprous Oxide

copper(I) oxide
powder
Cu_2O **C0217** 100 g **$ 9.05**
F.W. 143.09 **C0158** 500 g **29.45**

★ **HAZARD ALERT:** Moderately toxic by ingestion; body tissue irritant. LD_{50} 470 mg/kg.
Storage: Inorganic #4
Disposal: #26a
Shelf Life: Poor; oxidizes in moist air to cupric oxide, CuO.
Soluble: Acids and ammonium hydroxide; insoluble in water.
Color: Maroon
Odor: None
CAS No. 1317-39-1



Cyclohexane

laboratory grade
C_6H_{12} **C0113** 500 mL **$8.61**
F.W. 84.16

★ **HAZARD ALERT:** Dangerous fire risk; flammable liquid; slightly toxic by ingestion, inhalation and skin contact; store in a dedicated flammables cabinet. If one is not available, store in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can. LD_{50} 12705 mg/kg. TLV 1030 mg/m^3.
Storage: Organic #3 inside a dedicated flammables cabinet.
Disposal: #18a
Shelf Life: Indefinite if stored safely.
Soluble: Many organic solvents; insoluble in water.
Color: Colorless
Odor: Rubber cement-like
CAS No. 110-82-7



Cyclohexanol

laboratory grade
$C_6H_{11}OH$ **C0218** 100 mL **$11.30**
F.W. 100.16 **C0190** 500 mL **25.40**

★ **HAZARD ALERT:** Combustible; may form explosive peroxides, do not distill to dryness; slightly toxic by ingestion, inhalation and skin absorption. LD_{50} 2060 mg/kg. TLV 206 mg/m^3.
Storage: Organic #2 away from any oxidizers.
Disposal: #18b
Shelf Life: Fair to poor; substance hygroscopic; store in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can. Avoid prolonged storage.
Soluble: Slightly in water; miscible with many organic solvents.
Color: Colorless
Odor: Camphor-like
CAS No. 108-93-0
Technical Note: Melting point is 25 °C; this substance may be a solid at room temperature.



Cyclohexene

laboratory grade
C_6H_{10}
F.W. 82.15

C0114	100 mL	$10.61
C0141	500 mL	30.01

★ **HAZARD ALERT:** Flammable liquid; dangerous fire risk; slightly toxic by ingestion and inhalation; may form explosive peroxides, do not distill to dryness. Strong, offensive odor. Store in a dedicated flammables cabinet. If a flammables cabinet is not available, store in a Flinn *Saf-Stor*® Can. LD_{50} 2300 mg/kg. TLV 1010 mg/m^3.

Storage: Organic #3
Disposal: #18a
Shelf Life: Poor. Substance may form explosive peroxides; avoid prolonged storage.
Soluble: Alcohol; not water.
Color: Colorless
Odor: Paint thinner
CAS No. 110-83-8



L-Cysteine



amino acid, crystal
$HSCH_2CH(NH_2)CO_2H$
F.W. 121.16

C0420	5 g	$12.75

★ **HAZARD ALERT:** Slightly toxic by ingestion; body tissue irritant. LD_{50} 1890 mg/kg.

Storage: Organic #1
Disposal: #26a
Shelf Life: Good; oxidizes slowly in neutral or basic solution.
Soluble: Water, alcohol, acetic acid.
Color: White
Odor: Stale urine
CAS No. 52-90-4



D

Decanedioyl Chloride

see Sebacoyl Chloride

Decanoic Acid

capric acid
laboratory grade, crystal
$CH_3(CH_2)_8CO_2H$
F.W. 172.26

D0047	50 g	$13.75
D0048	100 g	20.45

★ **HAZARD ALERT:** Slightly toxic by inhalation, ingestion and skin absorption. Possible skin and eye irritant.

Storage: Organic #1
Disposal: #24a
Shelf Life: Fair to poor. Keep container tightly closed and store in a cool area.
Soluble: Many organic solvents; dilute nitric acid; practically insoluble in water.
Color: Buff
Odor: Fresh paint-like
CAS No. 334-48-5
Technical Note: Melting point is 31°C; material will be a fused solid.



Dehydrating Agents

see Calcium Chloride, Drierite®, etc.

Deionized Water

see Water, Deionized

Deoxyribonucleic Acid

DNA, from fish sperm

Free acid	D0025	10 g	$23.45
not highly polymerized	D0016	25 g	42.10

Storage: Organic #1
Disposal: #26a
Shelf Life: Poor; should be refrigerated.
Soluble: Water and many common organic solvents.
Color: Tan/buff
Odor: None



Desiccants

see Calcium Chloride, Drierite®, etc.

Detergents

see Cleaners

Dextrin

white, corn
powder

D0001	500 g	$9.70

Storage: Organic #2
Disposal: #26a
Shelf Life: Good if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Boiling water; not alcohol or ether.
Color: White
Odor: None
CAS No. 9004-53-9



Dextrose

glucose, anhydrous
reagent, granular
$C_6H_{12}O_6$
F.W. 180.16

D0002	500 g	$ 6.25
D0015	2 kg	19.45

Storage: Organic #2
Disposal: #26a
Shelf Life: Good if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 492-62-6



Dextrose

glucose, monohydrate
laboratory grade, powder
$C_6H_{12}O_6 \bullet H_2O$
F.W. 198.18

D0005	500 g	$6.95

Storage: Organic #2
Disposal: #26a
Shelf Life: Good if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 5996-10-1



Your Nose as an Indicator

Is your sense of smell a good indicator of exposure levels? In many cases your odor threshold may warn you in advance of a respiratory hazard. The bleach-like odor of chlorine and the medicinal smell of phenol are examples where your nose will alert you well before you reach a dangerous exposure level. However, ammonia and carbon tetrachloride are examples where your nose is too late. By the time your nose alerts you, the limit level may have been reached. At the slightest hint of exposure, get air into the area.

Dextrose Agar

bacteriological culture media

D0049	100 g	**$35.50**

Storage: With culture media.
Disposal: #26a
Shelf Life: Good if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: Buff
Odor: Dry dog food



Dextrose Solutions

see Glucose Solutions

Diastase

see Amylase

CONTACT US VIA E-MAIL
flinn@flinnsci.com

Diastase of Malt

a mixture containing amylolytic enzymes and sugars

D0050	25 g	**$ 6.95**
D0006	100 g	**17.90**

Storage: With culture media.
Disposal: #26a
Shelf Life: Poor unless kept dry; store in a Flinn *Chem-Saf*® Bag. Best stored under dry conditions in a refrigerator.
Soluble: Water; virtually insoluble in alcohol.
Color: Off-white
Odor: Gingerbread
CAS No. 9000-92-4



Technical Note: Diastase of malt digests (hydrolyzes) starch to malt sugar and contains some sugar. For quantitative digestive experiments, use amylase.

Diatomaceous Earth

filter aid
celite, infusorial earth
laboratory grade

D0017	500 g	**$11.70**
D0018	2 kg	**36.75**

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Good if kept dry; absorbs 2–4 times its weight in water; store in a Flinn *Chem-Saf*® Bag.
Soluble: Not in most common acids; soluble in strong alkalies.
Color: Off-white
Odor: Slightly spicy
CAS No. 61790-53-2



2,6-Di-t-Butyl-4-Methylphenol

BHT, butylated hydroxytoluene
laboratory grade, crystals
$((CH_3)_3C)_2CH_3C_6H_2OH$
F.W. 220.36

D0057	100 g	**$10.15**
D0058	500 g	**18.65**

★ **HAZARD ALERT:** Moderately toxic by ingestion and inhalation. Body tissue irritant. LD_{50} 890 mg/kg.

Continued on next column.

A Practical Goggle Policy

When the school owns the goggles the school is responsible for their cleanliness. Schools invest in sterilizers, cleaning solutions and other means of assuring sanitary goggles. Discuss with school administrators the practical aspects of the students each owning their own goggles. The school can simply sell each student his or her goggles. Those goggles can later be used to make certain home tasks safer, i.e., lawn mowing, auto repair, home shop work, etc.

2,6-Di-t-BUTYL-4-METHYLPHENOL *continued*

Storage: Organic #8
Disposal: #24a
Shelf Life: Indefinite
Soluble: Alcohol, xylenes and acetone
Color: White
Odor: None
CAS No. 128-37-0



Technical Note: A safer alternative for melting point determination: melting point is 69–71 °C.

Dibutyl Phthalate

see Butyl Phthalate

para-Dichlorobenzene

1,4-dichlorobenzene
laboratory grade, crystal
$C_6H_4Cl_2$
F.W. 147.01
M.P. 53 °C

D0007	500 g	**$ 7.40**
D0008	2 kg	**24.15**

★ **HAZARD ALERT:** Severe irritant to eyes, skin and respiratory tract. *Possible carcinogen*. Moderately toxic by ingestion. LD_{50} 500 mg/kg. The threshold limit value (TLV) for this substance is 60 mg/m^3 in air. Provide a high degree of ventilation. Use it for your melting point determination (most common use) but provide lots of ventilation.
Storage: Organic #4 in a Flinn *Chem-Saf*® Bag.
Disposal: #4b
Shelf Life: Fair to poor; substance volatile; store in a Flinn *Chem-Saf*® Bag.
Soluble: Insoluble in water; soluble in many organic solvents.
Color: White
Odor: Moth balls
CAS No. 106-46-7



Safety Purchase Suggestion: Cetyl alcohol, stearic acid and t-octyl phenol are safer alternatives for melting point determinations. A safer alternative for enthalpy of fusion experiments might be acetamide. Acetamide is now available already melted in a Pyrex® test tube. This ready-to-use package is reusable and will save both teacher and student time (see page 39).

1,2-Dichloroethane

see Ethylene Dichloride

2,6-Dichloroindophenol, Sodium Salt

DPIP
reagent, powder
$NaOC_6H_4N{:}C_6H_2(Cl_2){:}O$
F.W. 290.09

D0009	1 g	**$ 7.85**
D0026	5 g	**27.45**

Storage: Organic #8
Disposal: #5
Shelf Life: Poor, substance hygroscopic; solutions of this indicator have a poor shelf life; make fresh solution for best results.
Soluble: Water and alcohol
Color: Dark green
Odor: Throat lozenge
CAS No. 620-45-1



Technical Note: Use a 0.025% solution for Vitamin C determination.

2,4-Dichlorophenoxy Acetic Acid

2,4-D; an auxin
$C_8H_6Cl_2O_3$
F.W. 221.04

D0056	100 g	**$15.00**
	(Packaged in PVC-coated bottles)	

★ **HAZARD ALERT:** Toxic by ingestion; severe eye irritant. LD_{50} 375 mg/kg

2,4-DICHLOROPHENOXY ACETIC ACID continued on next page.

2,4-DICHLOROPHENOXY ACETIC ACID *continued*

Storage: Organic #1
Disposal: #4c
Shelf Life: Indefinite
Soluble: Slightly soluble in water, soluble in alcohol.
Color: Buff/tan
Odor: None
CAS No. 94-75-7
Technical Note: Use a 0.01–5.0 mg/L solution as a plant growth regulator.



Dichloromethane

see Methylene Chloride

Dimethylglyoxime

laboratory grade, powder
$(CH_3)_2C_2(NOH)_2$ **D0038** 10 g **$ 9.25**
F.W. 116.12 **D0010** 25 g **12.85**

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Alcohol and ether; not water.
Color: White
Odor: Yogurt-like
CAS No. 95-45-4



Dimethylglyoxime Solution

1%, alcoholic
D0033 100 mL **$6.10**

★ HAZARD ALERT: Flammable liquid; contains ethyl alcohol; toxic by ingestion and inhalation.
Storage: Organic #2 in a dedicated flammables cabinet.
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: Alcohol



Dimethyl Sulfoxide

methyl sulfoxide, DMSO
laboratory grade
$(CH_3)_2SO$ **D0051** 100 mL **$ 9.00**
F.W. 78.13 **D0052** 500 mL **24.95**

★ HAZARD ALERT: Readily penetrates the body through the skin and all organs. All of its properties have not been investigated.
Storage: Organic #7
Disposal: #18b
Soluble: Water and most organic solvents.
Color: Colorless
Odor: Smoked oysters
CAS No. 67-68-5



1,4-Dioxane

diethylene oxide
laboratory grade
$C_4H_8O_2$ **D0043** 100 mL **$25.91**
F.W. 88.10

★ HAZARD ALERT: A *possible carcinogen;* dangerous fire risk; slightly toxic by inhalation; absorbed by skin; may form explosive peroxides upon concentration. LD_{50} 5700 mg/kg. TLV 90 mg/m^3.
Storage: Organic #4 in a dedicated flammables cabinet inside a Flinn *Saf-Stor*® Can. Under no conditions should this product be stored in a naked glass bottle. It should be provided exterior protection with a Flinn *Saf-Stor*® Can or at least a *Chem-Saf*® Bag.
Disposal: #15

Continued on next column.

1,4-DIOXANE *continued*

Shelf Life: Poor; peroxide development is possible; *Flinn product has oxidation inhibitor* (sodium diethyldithiocarbamate) *added.*
Soluble: Miscible with water and most organic solvents.
Color: Colorless
Odor: Ether-like
CAS No. 123-91-1
Safety Purchase Suggestion: Avoid purchase and storage of this product on school premises.



Diphenylamine

laboratory grade, crystal
$(C_6H_5)_2NH$ **D0039** 25 g **$ 8.50**
F.W. 169.2 **D0027** 100 g **25.70**
M.P. 53 °C

★ HAZARD ALERT: Moderately toxic by ingestion. TLV 10 mg/m^3. LD_{50} 300 mg/kg.
Storage: Organic #2
Disposal: #5
Shelf Life: Indefinite
Soluble: Many organic solvents; not water.
Color: Light tan
Odor: Strong floral
CAS No. 122-39-4



Diphenyl-Thiocarbazone

see Dithizone

Disinfectant

see Lysol®

Distilled Water

see Water, Distilled

Dithizone

diphenyl-thiocarbazone
indicator for metals
reagent, crystal
$C_{13}H_{12}N_4S$ **D0028** 2.5 g **$18.85**
F.W. 256.32

Storage: Organic #2
Disposal: #5
Shelf Life: Indefinite
Soluble: Insoluble in water; slightly soluble in alcohol; soluble in carbon tetrachloride or chloroform.
Color: Blue/black
Odor: None
CAS No. 60-10-6



DNA

see Deoxyribonucleic Acid

Dodecanoic Acid

see Lauric Acid

Put On Your Goggles!

How many times a year do you say this? Having a firm goggle policy and taking a firm disciplinary stance on wearing goggles actually reduces the number of times you will have to say this. One teacher's idea for enforcing her goggle policy is to give the student and his or her lab partners a zero on the lab if any of them are caught not wearing their goggles. Peer pressure is a powerful enforcement tool—use it.

Dodecyl Alcohol

lauryl alcohol, 1-dodecanol
laboratory grade, crystal
$CH_3(CH_2)_{11}OH$ F.W. 186.34

D0034	25 g	$ 6.95
D0035	100 g	17.25

Storage: Organic #2
Disposal: #18b
Shelf Life: Indefinite
Soluble: Alcohol
Color: White
Odor: Flower-like
CAS No. 112-53-8



Technical Note: Melting point is 24 °C; material may be a liquid or fused solid.

Dodecyl Sulfate, Sodium Salt

sodium lauryl sulfate, sodium dodecyl sulfate, SDS
laboratory grade, powder
$CH_3(CH_2)_{11}OSO_3Na$ F.W. 288.38

D0040	25 g	$10.35
D0024	100 g	14.60

★ **HAZARD ALERT:** May be skin irritant. LD_{50} 1288 mg/kg.
Storage: Inorganic #2 or Organic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 151-21-3



Technical Note: Suitable for electrophoresis as an anionic detergent to denature proteins.

DPIP

see Dichloroindophenol

Drierite®

calcium sulfate, anhydrous
moisture absorbent, 8 mesh

Non-indicating white	D0011	500 g	$14.70
Indicating blue, changes to white when saturated	D0054	100 g	$10.90
	D0012	500 g	24.40

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Not meant to be put in solution.
Color: White or blue
Odor: None
CAS No. 7778-18-9



Dyes

see Food Coloring Dyes

Foot Safety

Feet, particularly bare or partially bare feet, bear the brunt of spills and dropped articles. Is foot damage common? Yes, it is! Should rules for foot protection be developed? Certainly! As the weather warms, the socks disappear and the footwear becomes skimpy. Just as chemical splash goggles are required in school laboratories, so should protective or, at least, sensible footwear be required.

E

EBT

see Eriochrome Black T

EDTA

see Ethylenediaminetetraacetic Acid

EMB Agar

eosin methylene blue
bacteriological culture media
powder E0021 100 g $38.45

Storage: With other culture media.
Disposal: #26a
Shelf Life: Very hygroscopic; keep dry; shelf life good if kept dry. Store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: Pink/violet
Odor: Malt-like



Enviro-Bond™ 403

oil absorbing material
E0058 100 g $9.15

Storage: Miscellaneous non-hazardous organic material.
Disposal: #26a
Shelf Life: Indefinite
Soluble: Insoluble
Color: White
Odor: None



Technical Note: Use with Marvel Mystery Oil (AP8927) to simulate an oil spill clean-up; please see page 440.

Eosin Y

biological stain/indicator
fluoresces in pH range 0.0 to 3.0
powder E0023 10 g $32.00

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Red/brown
Odor: None
CAS No. 17372-87-1
C.I. #45380



Eosin Y Solution

1%, alcoholic E0034 100 mL $8.10
(Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Flammable liquid. Contains ethyl alcohol; toxic by ingestion and inhalation.
Storage: Organic #9 in a dedicated flammables cabinet. If a flammables cabinet is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Good if stored safely.
Color: Orange
Odor: Alcohol



Epinephrine

see Adrenaline

Epsom Salts

see Magnesium Sulfate

Eriochrome Black T

EBT, biological stain/indicator
metal ion (calcium and magnesium) indicator in water using EDTA as titrant

E0050	10 g	$ 5.95
E0024	25 g	11.65

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Hot water; moderately soluble in alcohol.
Color: Black
Odor: New rubber
CAS No. 1787-61-7
C.I. #14645



Erythrosin B

acid red 51
biological stain/indicator
fluoresces in pH range 0 to 3.6

E0054	1 g	$ 9.80
E0055	5 g	21.35

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Brown/red
Odor: None
CAS No. 16423-68-0
C.I. #45430



Estrone

steroid with estrogenic activity
crystal — E0029 — 1 g — $34.60

★ **HAZARD ALERT:** A known *carcinogen*.
Storage: Organic #2 in a Flinn *Chem-Saf*® Bag.
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 53-16-7



Safety Purchase Suggestion: Avoid this substance on school premises. If you must use it, practice strict hygiene.

Ethanol

see Ethyl Alcohol

CAN'T FIND A CHEMICAL?
1-800-452-1261
PLEASE CALL US!

Ether, Ethyl

diethyl ether
contains peroxide inhibitor
$C_2H_5OC_2H_5$
F.W. 74.12

ACS Reagent anhydrous	E0048	100 mL	$ 9.71
	E0001	500 mL	19.91
Laboratory grade anesthesia	E0051	25 mL	$ 5.95
	E0052	50 mL	7.01
	E0003	100 mL	10.11

(All above package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** *Severe Fire and Explosion Hazard;* may form explosive peroxides; vapor harmful, use only under a hood or in a well-ventilated area. TLV 1210 mg/m^3. LD_{50} 1215 mg/kg.

Continued on next column.

ETHER, ETHYL *continued*

Storage: Organic #4 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can. **Never store this substance in an ordinary household refrigerator.** Avoid storing longer than 3–6 months. Buy and store only small quantities. Abide by label expiration date.
Disposal: #15
Shelf Life: Poor; avoid prolonged storage.
Soluble: Slightly in water; soluble in many common organic solvents.
Color: Colorless
Odor: Ether; aromatic, sweet, not unpleasant.
CAS No. 60-29-7



Safety Purchase Suggestion: Consider using an alternative, less hazardous substitute such as Flinn *Lull-A-Fly*© if you use ether to anesthetize *Drosophila*. *Lull-A-Fly* contains no ether.

Ether, Petroleum

see Petroleum Ether



See page 37 for a detailed explanation of the Flinn Hazard and Usefulness Code.

Ethyl Acetate

reagent grade
$CH_3COOC_2H_5$
F.W. 88.11

E0053	100 mL	$ 4.70
E0005	500 mL	8.90
E0006	4 liters	47.21

★ **HAZARD ALERT:** Dangerous fire hazard and explosion risk; irritating to skin and eyes; slightly toxic by inhalation, ingestion, and skin absorption. LD_{50} 6100 mg/kg. TLV 1440 mg/m^3.
Storage: Organic #3 in a dedicated flammables cabinet. If one is not available then store in a Flinn *Saf-Stor*® Can.
Disposal: #18a
Shelf Life: Good if stored safely.
Soluble: Slightly in water; soluble in many organic solvents.
Color: Colorless
Odor: Strong and more pungent than acetone.
CAS No. 141-78-6



Technical Note for Biology Teachers: This substance has been suggested for use in insect killing jars in lieu of other, more hazardous substances.

Ethyl Alcohol

absolute
not denatured

This is the alcohol that humans can consume. A federal and local license is required to sell such consumable alcohol. We do not have such a license and do not want to get one. If you need alcohol that contains no denaturant, go to your local liquor store and buy grain alcohol. It may be sold under some cute name, but what you are seeking is 100% pure grain alcohol. Store in a poison cabinet.

Anesthetic for Fruit Flies

Ether is frequently used as an anesthetic for fruit flies. Storage and disposal of ethyl ether is, however, a serious concern. Notice our special, small-package sizes (25- and 50-mL) of ether. These small sizes are specially designed to be used up in a single session and to leave no disposal concerns. For an alternative fruit fly anesthetic, see Lull-A-Fly on page 110.

Ethyl Alcohol

reagent alcohol, anhydrous
specially denatured formulation 3A
plus 5% isopropyl alcohol
C_2H_5OH F.W. 46.07

E0007	500 mL	**$ 9.10**
E0008	4 liters	**20.81**

★ **HAZARD ALERT:** Dangerous fire risk; flammable; addition of denaturant makes the product poisonous—it cannot be made non-poisonous; store in a dedicated flammables cabinet or safety cans. If a flammables cabinet or safety cans are not available, store in a Flinn *Saf-Stor*® Can. LD_{50} 7060 mg/kg. TLV 1880 mg/m^3.

Storage: Organic #2 in a dedicated flammables cabinet.
Disposal: #26b
Shelf Life: Excellent if stored safely.
Soluble: Miscible with water and many organic solvents.
Color: Colorless
Odor: Alcohol
CAS No. 64-17-5



Safety Purchase Suggestion: Do not buy large quantities or large package sizes of ethyl alcohol unless you have safe and fire-resistant storage facilities on your school premises.

Ethyl Alcohol

anhydrous, ethanol
denatured with isopropyl alcohol and methanol
C_2H_5OH F.W. 46.07

E0012	500 mL	**$ 5.40**
E0013	4 liters	**19.81**
E0014	20 liters	**74.91**

For hazard alert, storage, disposal, etc., see Ethyl Alcohol, E0007.
Color: Colorless
Odor: Alcohol



Ethyl Alcohol

95% ethanol
denatured with isopropyl alcohol and methanol
C_2H_5OH F.W. 46.07

E0009	500 mL	**$ 4.95**
E0010	4 liters	**18.41**
E0011	20 liters	**74.41**

For hazard alert, storage, disposal, etc., see Ethyl Alcohol, E0007.
Color: Colorless
Odor: Alcohol



Ethyl Alcohol

70% in water
denatured ethyl alcohol and water

E0030	500 mL	**$ 6.65**
E0031	4 liters	**19.15**

★ **HAZARD ALERT:** Toxic by ingestion.
Storage: Organic #2
Disposal: #26b
Shelf Life: Indefinite
Soluble: Water and many common organic solvents.
Color: Colorless
Odor: Alcohol



What Does "Denatured" Mean When Describing Ethyl Alcohol?

A denaturant is added to ethyl alcohol to make it unfit for use as a beverage. Frequently, the denaturant added is very toxic methyl alcohol (wood alcohol). Once denatured and thus unfit for human consumption, the whole issue of federal alcohol taxes is nullified. There are many, many formulations of denatured alcohol but the goal is always the same—to make ethyl alcohol unfit for use as a beverage.

Ethyl Alcohol Solution

1 Molar
(as C_2H_5OH)

E0042	500 mL	**$4.55**

★ **HAZARD ALERT:** Toxic by ingestion.
Storage: Organic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: Slight alcohol



Ethyl Alcohol (Burner Fuel, Safety)

Denatured ethyl alcohol with added sodium salt. The added presence of the sodium causes the flame to be more visible, thus reducing the potential for accidental burns.

E0025	4 liters	**$21.81**
E0026	20 liters	**78.31**

★ **HAZARD ALERT:** Dangerous fire risk; addition of denaturant makes the product poisonous—it cannot be made non-poisonous. Store in a dedicated flammables cabinet or safety cans. If they are not available, store in a Flinn *Saf-Stor*® Can.

Storage: Organic #2 in a dedicated flammables cabinet.
Disposal: #26b
Shelf Life: Excellent if stored safely.
Soluble: Miscible with water and many organic solvents.
Color: Colorless
Odor: Alcohol



Safety Purchase Suggestion: Do not buy large quantities or large package sizes of ethyl alcohol unless you have safe and fire-resistant storage facilities on your school premises.

Technical Note: *Never allow the use of duplicator fluid* for fueling alcohol burners. The products of combustion from duplicator fluids are extremely hazardous to your health and the health of your students.

Safer Alternative for Alcohol Burners: Consider acquiring portable gas burners which operate from small bottles of gas; see page 209. We suggest these portable gas burners are safer than alcohol burners. Yes, such burners are expensive, but if you calculate the real cost over the life of the burners, it may easily be equal to alcohol burners. Surely anything like a hot plate or these suggested gas burners are safer than alcohol burners.

Ethyl Carbamate

see Urethane



Ethylenediamine

reagent
$H_2NCH_2CH_2NH_2$ F.W. 60.10

E0040	100 mL	**$15.71**
E0038	500 mL	**46.01**

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Flammable; strong irritant to skin and eyes; moderately toxic by inhalation and skin absorption. Substance caustic and corrosive. Fumes at temperatures slightly above room temperature. Vapor irritating. LD_{50} 500 mg/kg. TLV 25 mg/m^3.

Storage: Organic #2 in a dedicated flammables cabinet; if one is not available then store in a Flinn *Saf-Stor*® Can.
Disposal: #26b
Shelf Life: Potentially poor, absorbs carbon dioxide from air, keep tightly closed and stored in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol; slightly in ether.
Color: Colorless
Odor: Ammonia
CAS No. 107-15-3



Ethylenediamine

1 Molar
(as $H_2NCH_2CH_2NH_2$) **E0056** 500 mL **$11.75**
(Packaged in PVC-coated bottles)

For hazard alert, storage, disposal, etc., see Ethylenediamine, E0040.

B4

Ethylenediaminetetraacetic Acid

EDTA
reagent, powder
$C_{10}H_{16}N_2O_8$ **E0016** 25 g **$ 9.10**
F.W. 292.25 **E0017** 100 g **12.35**

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Slightly in water; insoluble in most common organic solvents.
Color: White
Odor: None
CAS No. 60-00-4

D3

Ethylenediaminetetraacetic Acid

EDTA, disodium salt, dihydrate
reagent, powder
$C_{10}H_{14}N_2Na_2O_8 \cdot 2H_2O$ **E0044** 25 g **$ 7.05**
F.W. 372.25 **E0019** 100 g **11.45**

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Slightly in water; insoluble in most common organic solvents.
Color: White
Odor: None
CAS No. 6381-92-6

D3

Technical Note: The disodium salt is most convenient for the preparation of solutions for hard water analysis. A 0.01 M disodium EDTA solution works well in this regard.

Ethylene Dichloride

1,2-dichloroethane
laboratory grade
$C_2H_4Cl_2$ **E0015** 500 mL **$9.33**
F.W. 98.97

★ **HAZARD ALERT:** *Possible carcinogen;* flammable, dangerous fire risk; moderately toxic by ingestion, inhalation and skin absorption; strong skin and eye irritant. LD_{50} 670 mg/kg. TLV 40 mg/m^3.

Storage: Organic #4 in a Flinn *Chem-Saf*® Bag, then inside a dedicated flammables cabinet. If one is not available then store in a Flinn *Saf-Stor*® Can.
Disposal: #27j
Shelf Life: Gradually decomposed by air, light and moisture forming hydrochloric acid.
Soluble: Slightly in water; miscible with most organic solvents.
Color: Colorless
Odor: Chloroform-like
CAS No. 107-06-2

A3

Ethylene Glycol

laboratory grade
$HOCH_2CH_2OH$ **E0020** 500 mL **$6.55**
F.W. 62.07

★ **HAZARD ALERT:** Moderately toxic by ingestion, inhalation, and skin absorption, but the ingestion of even small quantities can be lethal to some people. LD_{50} 4700 mg/kg. TLV 127 mg/m^3 as vapor and mist.

Storage: Organic #2
Disposal: #18b

Continued on next column.

ETHYLENE GLYCOL *continued*

Shelf Life: Substance is hygroscopic; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, alcohol and acetone.
Color: Colorless
Odor: Auto anti-freeze
CAS No. 107-21-1

B3

Ethylenedinitrilotetraacetic Acid

see Ethylenediaminetetraacetic Acid

Ethyl Ether

see Ether, Ethyl

Eugenol

see Clove Oil

F

FAA Solution

formalin-aceto-alcohol
fixative; also preservative for algae
F0026 500 mL **$7.95**

★ **HAZARD ALERT:** Major ingredient is ethyl alcohol. Toxic by ingestion.
Storage: Organic #2
Disposal: #18b
Shelf Life: Good if stored safely.
Color: Colorless
Odor: Alcohol

C3

Fast Green FCF

biological stain **F0066** 1 g **$8.20**

★ **HAZARD ALERT:** Slightly toxic by ingestion. LD_{50} 2000 mg/kg.
Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; only very slightly in alcohol.
Color: Dark crimson
Odor: None
CAS No. 2353-45-9
C.I. #42053

C4

Fast Green Solution

tissue cell staining solution
contains: fast green, water and acetic acid
* **F0058** 20 mL **$8.05**

For storage, disposal, etc., see Fast Green FCF Stain, F0066.
Color: Dark green
Odor: Slight vinegar

C4

*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Ethyl Ether

It's the end of the school year—have you checked the expiration date of your ethyl ether? We strongly recommend that ethyl ether not be stored for periods longer than 3 to 6 months. With age, ethyl ether may form explosive peroxides. If your ethyl ether is nearing its expiration date, dispose of it before leaving for the summer. Check your current *Flinn Scientific Catalog/Reference Manual* for the proper disposal method.

Fehlings Solution A

contains: cupric sulfate and water
test for reducing sugars and aldehydes

F0001	500 mL	$ 4.45
F0050	4 liters	22.40

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Fair
Color: Blue
Odor: None



Fehlings Solution B

contains: potassium sodium tartrate, sodium hydroxide and water
test for reducing sugars and aldehydes

F0002	500 mL	$ 6.85
F0051	4 liters	41.30

★ **HAZARD ALERT:** Solution is caustic; avoid eye and skin exposure.
Storage: Inorganic #4
Disposal: #10
Shelf Life: Fair
Color: Colorless
Odor: None



Ferric ... Iron(III) ...
Iron compounds in which the iron has an ionic charge or oxidation number of three.

Ferric Ammonium Citrate

ammonium iron(III) citrate
(so called brown)
laboratory grade, powder

F0052	100 g	$ 6.75
F0003	500 g	16.35

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; substance deliquescent; affected by light; store in Flinn *Chem-Saf*® Bag and then inside Flinn *Saf-Stor*® Can.
Soluble: Water; not alcohol.
Color: Mustard
Odor: None
CAS No. 1185-57-5



Ferric Ammonium Sulfate

ammonium iron(III) sulfate
reagent, crystal
$FeNH_4(SO_4)_2 \cdot 12H_2O$
F.W. 482.21

F0053	25 g	$6.00
F0004	100 g	9.25

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; substance efflorescent; light sensitive; store in a Flinn *Chem-Saf*® Bag.

Continued on next column.

Too Much Light!

A good example of a substance with light sensitivity is ferric citrate. The substance readily dissolves in hot water. After long exposure to light the product becomes virtually insoluble. Our material is packaged in an amber bottle and stored inside a can. The purpose of such a package is to extend the life of the chemical for as long as possible. How do we communicate this to the school that looks only for low price?

FERRIC AMMONIUM SULFATE *continued*

Soluble: Water; not alcohol.
Color: Light purple
Odor: None
CAS No. 7783-83-7



Ferric Chloride

iron(III) chloride
reagent, lump
$FeCl_3 \cdot 6H_2O$
F.W. 270.32

F0006	100 g	$ 7.11
F0007	500 g	17.41

★ **HAZARD ALERT:** Skin and tissue irritant; corrosive; slightly toxic by ingestion. LD_{50} 1278 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; substance hygroscopic; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and other common organic solvents.
Color: Mustard
Odor: Slight chlorine
CAS No. 10025-77-1



Ferric Chloride, Gramolpak

0.1 Molar
(as $FeCl_3 \cdot 6H_2O$) * F0070 pkg. $7.20

For hazard alert, storage, disposal, etc., see Ferric Chloride, F0006.
*Gramolpak® is a unique package which makes 1 liter with distilled water.





Ferric Chloride Solution

(as $FeCl_3 \cdot 6H_2O$)

1.0 Molar*	F0069	100 mL	$7.20
0.1 Molar†	F0045	500 mL	9.00

★ **HAZARD ALERT:** May be skin/tissue irritant.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Amber
Odor: None





Ferric Citrate

iron(III) citrate
reagent, powder
$FeC_6H_5O_7 \cdot 5H_2O$
F.W. 244.95

F0057 10 g $13.90

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair if contact with light is avoided.
Soluble: Hot water, not alcohol; solubility decreases with age.
Color: Brown/black
Odor: None
CAS No. 2338-05-8
Technical Note: Keep away from light.



Ferric Nitrate

iron(III) nitrate
reagent, crystal
$Fe(NO_3)_3 \cdot 9H_2O$
F.W. 404.00

F0008	100 g	$ 8.11
F0009	500 g	16.11

★ **HAZARD ALERT:** Strong oxidizer; skin and tissue irritant. LD_{50} 3250 mg/kg.
Storage: Inorganic #3
Disposal: #26a
Shelf Life: Fair to poor; substance hygroscopic; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: Light violet
Odor: Slight nitric acid
CAS No. 7782-61-8



Ferric Nitrate, Gramolpak

0.1 Molar
(as $Fe(NO_3)_3 \bullet 9H_2O$) * **F0071** pkg. **$6.35**

For hazard alert, storage, disposal, etc., see Ferric Nitrate, F0008.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Ferric Nitrate Solution

(as $Fe(NO_3)_3 \bullet 9H_2O$)
0.2 Molar **F0046** 500 mL **$6.55**
0.1 Molar **F0047** 500 mL **5.90**

★ HAZARD ALERT: May be skin/tissue irritant.
Storage: Inorganic #3
Disposal: #26b
Shelf Life: Good
Color: Amber
Odor: None



Ferric Nitrate Solution, Acidified

ferric nitrate plus nitric acid
0.2 Molar **F0048** 500 mL **$12.45**

★ HAZARD ALERT: Corrosive liquid.
Storage: Inorganic #3
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Ferric Oxide

iron(III) oxide, hematite
reagent grade, powder
Fe_2O_3 **F0067** 100 g **$ 6.25**
F.W. 159.69 **F0010** 500 g **11.90**

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: In acids; not water.
Color: Rust
Odor: None
CAS No. 1309-37-1



Ferric(ous) Oxide

see Ferrosoferric Oxide

Ferric Sulfate

iron(III) sulfate
reagent grade, powder
$Fe_2(SO_4)_3 \bullet xH_2O$ **F0031** 100 g **$15.80**
F.W. 399.89 (as $Fe_2(SO_4)_3$) **F0032** 500 g **53.35**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; hygroscopic; keep tightly closed and protected from light; store in Flinn *Chem-Saf*® Bag and then inside Flinn *Saf-Stor*® Can.
Soluble: Water
Color: Buff
Odor: None
CAS No. 10028-22-5



Technical Note: Ferric sulfate has approximately 20% water content.

Ferroin Solution

0.5% aqueous
oxidation–reduction indicator
contains: 1,10-phenanthroline, ferrous sulfate and water
* **F0073** 10 mL **$7.35**

Storage: Organic #2

Continued on next column.

FERROIN SOLUTION *continued*

Disposal: #5
Shelf Life: Good
Color: Red
Odor: None



*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Ferrosoferric Oxide

iron(II, III) oxide, ferric ferrous oxide, triiron tetraoxide, black iron oxide
laboratory grade, powder
Fe_3O_4 **F0012** 500 g **$11.20**
F.W. 231.54

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: In acids; not water.
Color: Black
Odor: None
CAS No. 1317-61-9



Ferrous... Iron(II)...
Iron compounds in which the iron has an ionic charge or oxidation number of two.

Ferrous Ammonium Sulfate

reagent grade, crystal
$Fe(NH_4)_2(SO_4)_2 \bullet 6H_2O$ **F0013** 100 g **$10.10**
F.W. 392.16 **F0014** 500 g **23.35**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; substance deliquescent and affected by light; store in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can.
Soluble: Water; not alcohol.
Color: Light green
Odor: None
CAS No. 7783-85-9



Ferrous Ammonium Sulfate Solution

0.1 Molar
(as $Fe(NH_4)_2(SO_4)_2 \bullet 6H_2O$)
F0030 500 mL **$8.95**
(Packaged in PVC-coated bottles)

★ HAZARD ALERT: Corrosive; contains dilute sulfuric acid.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Excellent
Color: Light green
Odor: None



Is the Water in a Portable Eyewash Safe?

It would be best if your eyewash had fresh tap water as its water source. If not, it is important to remember that water in portable eyewash units should be emptied and refilled weekly. The units should be thoroughly cleaned at least monthly using a strong detergent and/or a chlorine solution. The addition of anti-bacterial agents to these units is discouraged. Make every effort to replace such eyewash devices.

Ferrous Chloride

iron(II) chloride
reagent grade, crystal
$FeCl_2 \cdot 4H_2O$ **F0041** 25 g **$ 9.60**
F.W. 198.81 **F0015** 100 g **20.35**

★ **HAZARD ALERT:** Slightly toxic by ingestion; body tissue irritant.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; substance deliquescent and easily oxidized; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: Pea green
Odor: Slight chlorine
CAS No. 13478-10-9



Ferrous Sulfate

iron(II) sulfate
laboratory grade, granular
$FeSO_4 \cdot 7H_2O$ **F0016** 500 g **$6.80**
F.W. 278.03

★ **HAZARD ALERT:** Slightly toxic by ingestion. LD_{50} 1520 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; substance hygroscopic; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; not alcohol.
Color: Light green
Odor: None
CAS No. 7782-63-0



Ferrous Sulfate Solution

(as $FeSO_4 \cdot 7H_2O$ + sulfuric acid)
0.01 Molar, acidified **F0049** 500 mL **$7.55**

★ **HAZARD ALERT:** Corrosive to skin, eyes and mucous membranes; slightly toxic.
Storage: Inorganic #2
Disposal: #24a
Shelf Life: Good
Color: Colorless
Odor: None



Ferrous Sulfide

iron(II) sulfide
laboratory grade, lump
H_2S generating
FeS **F0042** 100 g **$15.15**
F.W. 87.91 **F0017** 500 g **30.10**

★ **HAZARD ALERT:** Contact with acid liberates poisonous hydrogen sulfide gas; **do not dispose of the product down a drain that might contain acid.** Hydrogen sulfide gas is toxic and flammable.
Storage: Inorganic #5
Disposal: #26a

Continued on next column.

Safety Posters

Is safety important to you? Are your laboratory safety rules important enough to post in the science laboratory? Safety posters are a super safety aid. They are a constant reminder to students that safety is important. Make posters yourself or use our "Fox E. Flinn" safety posters (see page 912). If it's important—post it!

FERROUS SULFIDE *continued*

Shelf Life: Must be stored away from any source of moisture and away from any acid; store in Flinn *Chem-Saf*® Bag and then inside Flinn *Saf-Stor*® Can.
Soluble: Acids; not water.
Color: Metallic gray
Odor: None
CAS No. 1317-37-9



Fluorescein

uranin, disodium salt
fluorescent dye/indicator
pH 4.0 colorless to 4.5 dark green with fluorescence
reagent grade, crystal
$C_{20}H_{10}O_5Na_2$ **F0043** 25 g **$ 8.40**
F.W. 376.26 **F0018** 100 g **17.05**
Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Rust/orange
Odor: None
CAS No. 518-47-8



FLINN PRICES ARE GUARANTEED FOR A FULL YEAR

Fluorspar

see Calcium Fluoride

Foam

see Polyurethane Foam System

Food Coloring Dyes

Dye set **V0003** set **$5.00**
contains 0.25 oz. each of red, yellow, blue, and green
Red food dye **V0006** 100 mL **$9.95**
Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Various as above
Odor: None



Formaldehyde

37% solution
HCHO
F.W. 30.03
ACS Reagent **F0074** 100 mL **$ 5.51**
10–15% methanol **F0019** 500 mL **8.61**
F0020 4 liters **36.71**
Laboratory grade **F0021** 4 liters **$17.81**
6–8% methanol

★ **HAZARD ALERT:** *Alleged carcinogen;* strong irritant; avoid breathing vapor and avoid skin contact. Use a fume hood. Highly toxic by ingestion, inhalation, and skin absorption. LD_{50} 100 mg/kg. TLV 0.3 ppm, PEL 0.75 ppm as formaldehyde gas.
Storage: Organic #3
Disposal: #2
Shelf Life: Fair. As formaldehyde ages and concentrates, a white flaky substance evolves. This is paraformaldehyde.
Soluble: Water and alcohol
Safer Alternative: See listing for Formalternate®
Color: Colorless
Odor: Formaldehyde
CAS No. 50-00-0



Formalin

10% formaldehyde solution
neutral, buffered

F0035	1 liter	$16.60
F0036	4 liters	37.45

★ HAZARD ALERT: Formaldehyde is an *alleged carcinogen.* This is a very weak (10%) solution of formaldehyde; nevertheless, avoid skin contact. Provide lots of ventilation.

Storage: Organic #3
Disposal: #2
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Colorless
Odor: Formaldehyde



Safety Purchase Suggestion: See next listing for Formalternate.

Formalternate®, Concentrate

non-formaldehyde substitute

* F0056	500 mL	$16.10

*Each 500 mL makes 5 liters of ready-to-use solution.

Storage: Organic #2
Disposal: #26b
Shelf Life: Indefinite
Soluble: Water
Color: Colorless
Odor: None



Technical Note: Formalternate can be used in lieu of formaldehyde in the storage (not fixation) of biological specimens. Substance is in concentrated form: dilute 1 volume concentrate per 9 volumes water to make 10 volumes of solution. Complete use instructions are furnished. This solution is an alternative for formaldehyde only for biological specimen storage. It is not a chemical substitute.

Formic Acid

23 Molar
88% solution
ACS reagent
HCOOH
F.W. 46.03

F0044	100 mL	$ 9.41
F0023	500 mL	21.31

★ HAZARD ALERT: Corrosive to skin and tissue; reacts violently with bases. Upon aging, decomposes to carbon monoxide and water thus creating potential explosive danger in a tightly sealed bottle. Explosions have occurred. Slightly toxic by ingestion and inhalation. LD_{50} 1100 mg/kg. TLV 9.4 mg/m^3.

Storage: Organic #1 in a dedicated acid cabinet; if one is not available store in a Flinn *Saf-Cube*®.
Disposal: #24a
Shelf Life: Poor; recent information suggests it ages poorly and may be an explosion risk. Avoid extended storage.
Soluble: Water, alcohol and ether.
Color: Colorless
Odor: Penetrating, strong, vinegar-like
CAS No. 64-18-6



Fructose

see Levulose

Fuchsin Acid

biological stain/indicator
pH 12.0 red to 14.0 colorless
$C_{20}H_{17}N_3Na_2O_9S_3$
F.W. 585.54

F0027	5 g	$15.15

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Dark metallic green
Odor: None
CAS No. 3244-88-0
C.I. #42685



Formaldehyde Technical Notes

Formaldehyde and Cancer

The National Institute for Occupational Safety and Health (NIOSH) has issued a Current Intelligence Bulletin No. 34, 15 April 1981, discussing the evidence for carcinogenicity of formaldehyde. It is listed as publication No. 81-111 and is available from NIOSH at Robert A. Taft Laboratories, 4676 Columbia Parkway, Cincinnati, OH 45226.

NIOSH recommends, "...that formaldehyde be handled as a potential occupational carcinogen and that appropriate controls be used to reduce worker exposure. These recommendations are based primarily on a study in which laboratory rats and mice exposed to formaldehyde vapor developed nasal cancer, and are supported by a New York University study where rats exposed to a mixture of formaldehyde and hydrochloric acid vapors developed nasal cancer. Formaldehyde has also been shown to be a mutagen in several short-term laboratory studies. In addition to the carcinogen potential, other adverse health effects caused by formaldehyde have been described."

NIOSH, lacking a risk estimate to people exposed at or below the current PEL 0.75 ppm standard, recommends efforts be made to reduce occupational exposure to the lowest feasible limit. For example, where formaldehyde-preserved animal specimens are used in laboratories, they should be washed in gently running water overnight to reduce student exposure. Alternatively, non-formaldehyde-preserved specimens, which need not be washed, can be purchased from supply houses, such as Flinn. In histology, where formaldehyde is often used as an ingredient in fixatives, the use of a fume hood is recommended.

Are Formaldehyde and Formalin the Same Substance?

Formaldehyde, in its basic form, is a gas. Most science teachers think of formaldehyde as a liquid. The liquid is actually a mixture of formaldehyde gas and water. The most common concentration used in school science departments (particularly biology) is a 37% solution. That solution consists of 37 grams of formaldehyde gas to 100 mL of solution. Formaldehyde solution will polymerize. (Polymerize: simple molecules combining to form a chain-like macro-molecule.) To prevent polymerization of formaldehyde solution, about 10–15% of methyl alcohol is added. It is the addition of the methyl alcohol that causes the substance to be called formalin as opposed to formaldehyde. It is correct to use the terms formalin and formaldehyde solution interchangeably.

Formaldehyde Substitutes

No, you need not discard your existing inventory of preserved animals and other specimens. It is possible to displace the present formaldehyde preservative solution with a substitute liquid. Please write or telephone us for our practical and inexpensive suggestions.

Strange-Looking Formaldehyde

A bottle of formaldehyde has been on your shelf for a long time. You notice a white, flaky sediment at the bottom of the container. What is it? The formaldehyde has polymerized and formed these large flakes. Is it more dangerous? No! Can you decant off the liquid and still use it? Yes! What can you do with the sediment? Remove it from the bottle. Allow it to air dry (the stench will be obnoxious) and place it in a landfill permitted to accept such materials. See the Disposal Section on pages 974–1007.

Fuchsin Acid Staining Solution

1%, aqueous

*	F0060	20 mL	$6.65

For storage, disposal, etc. see Fuchsin Acid, F0027.
Color: Ruby red
Odor: None
*Special and unique dropping bottle package called a Flinn *E-Z Drop®*.

Fuchsin, Basic

basic parafuchsin, pararosaniline chloride
biological stain and acid/base indicator
pH to 1.2 purple to 3.0 red and
11.6 red to 14.0 colorless
crystal F0039 10 g $67.75

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Green metallic
Odor: None
CAS No. 569-61-9

Fuchsin, Basic, Staining Solution

indicator solution
1%, aqueous * F0062 20 mL $5.35

For storage, disposal, etc., see Fuchsin, Basic, F0039.
Color: Red
Odor: None
*Special and unique dropping bottle package called a Flinn *E-Z Drop®*.

Fuller's Earth

kaolin containing aluminum magnesium silicate
laboratory grade
F0024 500 g $8.70

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Generally insoluble
Color: Beige
Odor: None
CAS No. 8031-18-3

Fumaric Acid

laboratory grade, powder
$C_4H_4O_4$ F0054 100 g $ 6.90
F.W. 116.08 F0055 500 g 15.15

Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Slightly in water and alcohol; insoluble in chloroform and benzene.
Color: White
Odor: None
CAS No. 110-17-8

Are Your Signs in Compliance?

Various OSHA standards require the use of safety signs to identify all safety equipment and exits. Do you have signs identifying the location of your fire blanket, fire extinguisher, eyewash, etc.? If not, check out the safety signs on pages 915–916 or make your own using a computer and an ink-jet printer.

G

D-Galactose

anhydrous
$C_6H_{12}O_6$ G0041 50 g $15.40
F.W. 180.09 G0018 100 g 18.65

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Hot water and pyridine
Color: White
Odor: Malt
CAS No. 59-23-4

Galena

see Lead Sulfide

Gallium

small pieces
Ga G0031 2.5 g $38.40
A.W. 69.72

Storage: Inorganic #1
Disposal: #27a
Shelf Life: Poor; moisture sensitive.
Soluble: Acid, alkali and slightly in mercury.
Color: Silvery/white
Odor: None
CAS No. 7440-55-3
Technical Note: Melting point is 29.8 °C; may be a liquid or fused solid.

Gases, Lecture Bottle

See individual listing in bottled gas section of Catalog and repeated under individual gas names (e.g., oxygen) in chemical listings.

Gastric Juice

artificial
contains: pepsin, hydrochloric acid, lactic acid and water

G0011	100 mL	$7.05
G0012	500 mL	8.65

★ **HAZARD ALERT:** Body tissue irritant.
Storage: Inorganic #9
Disposal: #26b
Shelf Life: Fair
Color: Colorless
Odor: None

Gelatin

laboratory grade, granular
medium Bloom G0037 150 g $ 7.15
G0004 500 g 13.95

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Hot water; insoluble in most organic solvents.
Color: Buff
Odor: Faint; musty.
CAS No. 9000-70-8
Technical Note: Mix 25–30 g per liter of deionized water to make a firm gel.

Gentian Violet

see Crystal Violet

Ghost Crystals

see page 450 in the Chemistry of Toys section

Gibberellic Acid

Gibberellin A_3
crystal
$C_{19}H_{22}O_6$
F.W. 346.41

G0042	0.5 g	$17.60
G0003	1 g	21.85

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Slightly in water; methyl and ethyl alcohol; acetone; soluble in aqueous solution of sodium bicarbonate and sodium acetate.
Color: White
Odor: None
CAS No. 77-06-5



Technical Note: Use a 0.01–5.0 mg/L solution as a plant growth promoter.

Gibberellic Acid, Potassium Salt

10%
$C_{19}H_{21}KO_6$
F.W. 384.50

G0045	0.5 g	$10.50
G0046	1 g	19.60

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water



Technical Note: Solutions of gibberellic acid store poorly. Avoid storing a solution for longer than a few days. You will find two gibberellic acid products listed above. The first is 100% gibberellic acid and is soluble in alcohol but only slightly in water. To make a stock solution of this substance add 1 gram to 5 mL of 95% ethyl alcohol. Add a drop or two of baby shampoo. The baby shampoo acts as a wetting agent. Now add this volume to 1 liter of warm, distilled or deionized water. You may use tap water but pure water would eliminate variables that may affect your results. The resultant solution contains 1000 ppm of gibberellic acid.

The second product we list is a salt of gibberellic acid, specifically a potassium salt. The major difference is that the potassium salt of gibberellic acid is water soluble. Since it is water soluble you can skip the alcohol step but continue to add the shampoo. Also, the potassium salt of gibberellic acid is only a 10% product. If you mix 1 gram of this substance with a liter of water, the resultant solution is 100 ppm.

Both products—alcohol soluble, 100% gibberellic acid and water soluble, 10% potassium salt of gibberellic acid—will act as plant growth promoters.

Giemsa

blood staining stock solution
contains: giemsa, glycerin and methyl alcohol

G0021	100 mL	$28.80

★ HAZARD ALERT: Treat as a flammable liquid because of the methyl alcohol constituent. Toxic by ingestion and inhalation.
Storage: Organic #2 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Indefinite



Glass Wool, Medium

G0034	100 g	$15.80
G0023	454 g	24.90

★ HAZARD ALERT: Wear gloves when handling glass wool.
Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Insoluble except in hydrofluoric acid.



Glauber's Salt

see Sodium Sulfate

Glucose

For powder or granular material see Dextrose; for standard solutions of glucose see the glucose listings that follow this cross reference.

Glucose Solution

dextrose
standard solutions

1 mL = 10 mg	G0024	100 mL	$7.75
1 mL = 2 mg	G0025	100 mL	8.50
1 mL = 1 mg	G0026	100 mL	8.55

Storage: Organic #2
Disposal: #26b
Shelf Life: Poor; please acquire only small quantities since the shelf life is limited to one year once the bottle is opened.
Color: Colorless
Odor: None



CAN'T FIND A CHEMICAL?
1-800-452-1261
PLEASE CALL US!

Glucose-1-Phosphate, Dipotassium Salt

$C_6H_{11}K_2O_9P \bullet 2H_2O$
F.W. 372.35

G0006	1 g	$19.90

Storage: Organic #2
Disposal: #26a
Shelf Life: Good, if kept dry. Store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: White
Odor: None
CAS No. 5996-14-5



Glucose-1-Phosphate, Disodium Salt

$C_6H_{11}Na_2O_9P \bullet 4H_2O$
F.W. 376.16

G0005	1 g	$15.90

Storage: Organic #2
Disposal: #26a
Shelf Life: Good, if kept dry. Store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: White
Odor: None
CAS No. 59-56-3



Glucose Test Strips

glucose test paper for urine sugar determination
package contains 100 test strips

T0004	1 pkg.	$17.50

Storage: With test papers.
Disposal: #26a
Shelf Life: Indefinite



Hazard Definitions

Carcinogen:	Any substance that causes the development of cancerous growths in living tissue.
Mutagen:	Any substance able to induce mutations in DNA and living cells.
Teratogen:	Any substance that causes growth abnormalities in embryos, genetic modifications in cells, etc.
Allergen:	Any substance which produces an allergic reaction.

Glutathione

reduced
$C_{10}H_{17}N_3O_6S$ G0048 1 g $21.25
F.W. 307.3

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and dilute alcohol
Color: White
Odor: None
CAS No. 70-18-8



Glutaraldehyde

49 wt % in water
$OHC(CH_2)_3CHO$ G0028 100 mL $12.35
F.W. 100.11

★ **HAZARD ALERT:** Irritates eyes, skin and respiratory tract; avoid prolonged skin contact. Highly toxic by ingestion, inhalation and skin contact. LD_{50} 134 mg/kg.
Storage: Organic #3
Disposal: #2
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Colorless
Odor: Distinct chlorine
CAS No. 111-30-8





Glutaric Dialdehyde

see Glutaraldehyde

Glycerin

glycerol
$C_3H_5(OH)_3$
F.W. 92.10

ACS Reagent G0019 100 mL $ 6.35
for electrophoresis
Laboratory grade G0007 500 mL $ 8.25
G0008 4 liters 53.95

★ **HAZARD ALERT:** Some people are allergic to glycerin and may experience irritation to their skin and eyes. Contact with strong oxidants (chromium trioxide, potassium chlorate, potassium permanganate) may cause an explosion. LD_{50} 12600 mg/kg.
Storage: Organic #2
Disposal: #26b
Shelf Life: Indefinite
Soluble: Water and alcohol; insoluble in some common organic solvents.
Color: Colorless
Odor: None
CAS No. 56-81-5



What To Do the First Day of Lab?

Start the year with safety as your number-one goal. Before starting your first lab, take a day or two to discuss the rules of the lab and the student safety contract and to administer a safety exam. If you don't have a safety contract, contact us and we will send you a copy of our free Flinn Safety Contract. Let your students know how important safety is to you and to their success in lab.

Glycerin, Jelly

Slide mounting media for organisms such as roundworms, insects, plant specimens, etc.
G0030 100 mL $10.30

Storage: Organic #2
Disposal: #18b
Shelf Life: Excellent
Color: Yellow
Odor: None



Glycerin Solution

15% v/v, aqueous solution
G0043 500 mL $7.60

For hazard alert, storage, disposal, etc., see Glycerin, G0007.



Glycerol

see Glycerin

Glycine

aminoacetic acid
laboratory grade, crystal
NH_2CH_2COOH G0035 100 g $ 9.95
F.W. 75.05 G0017 500 g 24.40

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; insoluble in alcohol and ether.
Color: White
Odor: None
CAS No. 56-40-6



Glycogen

from oysters
powder G0015 1 g $15.20
$(C_6H_{10}O_5)_n$ G0016 5 g 36.35

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 9005-79-2



Glyoxal

40 wt % solution in water
OHCCHO G0047 25 mL $6.25

★ **HAZARD ALERT:** Possible tissue irritant; slightly toxic by ingestion. LD_{50} 2750 mg/kg.
Storage: Organic #3
Disposal: #26b
Color: Yellow
Odor: None
CAS No. 107-22-2



Gram Iodine Solution

see Iodine Solution, Gram

Graphite Powder

90–97% G0010 500 g $12.95

★ **HAZARD ALERT:** As a fine powder graphite is a fire risk. TLV 2.5 mg/m^3.
Storage: Inorganic #4; store in a Flinn *Saf-Stor*® Can.
Disposal: #26a
Shelf Life: Indefinite
Color: Gray/black
Odor: None
CAS No. 7782-42-5



Guar Gum

laboratory grade, powder

G0038	25 g	$ 4.95
G0039	100 g	10.45
G0040	500 g	17.85

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Buff
Odor: Freshly cut grass
CAS No. 39421-75-5



Technical Note: This material is most frequently used for preparing slime.

Gum Arabic

see Acacia

Gypsum

see Calcium Sulfate

H

Helium Gas

Lecture bottle	LB1010	2 cu. ft. (56 liters)	$109.21
Refillable cylinder	LB1065	3.6 cu. ft. (100 liters)	$214.21

★ **HAZARD ALERT:** Teachers should discourage students from inhaling helium—a common practice, we are told, since helium will change voice sound. Discourage this practice.
Storage: In an area dedicated to bottled gases.
Disposal: Completely empty lecture bottle, then follow #26a.
Shelf Life: Indefinite
Soluble: Slightly in water; insoluble in alcohol.
Color: None
Odor: None
CAS No. 7440-59-7



Technical Note: Helium gas lecture bottle is color-coded with the top half yellow and the bottom half black.

Hematoxylin

biological stain

H0012	10 g	$34.00

(Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Body tissue irritant.
Storage: Organic #2 in a Flinn *Chem-Saf*® Bag.
Disposal: #4c
Shelf Life: Light sensitive; store in a Flinn *Saf-Stor*® Can.
Soluble: Hot water, alcohol and glycerin.
Color: Buff
Odor: Slight vinegar
CAS No. 517-28-2
C.I. #75290



n-Heptane

laboratory grade
C_7H_{16}
F.W. 100.21

H0051	100 mL	$ 6.30
H0001	500 mL	11.85

★ **HAZARD ALERT:** Dangerous fire risk; flammable liquid; slightly toxic by inhalation. TLV 1640 mg/m^3.
Storage: Organic #3 in a dedicated flammables cabinet. If a flammables cabinet is not available, then store in a Flinn *Saf-Stor*® Can.
Disposal: #18a
Shelf Life: Good if stored safely.
Soluble: Alcohol, ether and chloroform; not water.
Color: Colorless
Odor: Paint thinner
CAS No. 142-82-5



Hexamethylenediamine

1,6-hexanediamine
80–95%, aqueous solution
$H_2N(CH_2)_6NH_2$
F.W. 116.20

H0045	25 g	$ 9.60
H0030	100 g	13.51
H0020	250 g	28.61

★ **HAZARD ALERT:** Moderately toxic by ingestion; strong tissue irritant. LD_{50} 750 mg/kg.
Storage: Organic #2
Disposal: #26b
Shelf Life: Indefinite
Soluble: Water; slightly in alcohol.
Color: Colorless
Odor: Ammonia
CAS No. 124-09-4



Technical Note: Below room temperature this substance is a crystalline solid. Melting point is approximately 40 °C. Warm reagent bottle in water bath until sufficient solid has melted and the liquid can be decanted.

Hexamethylenediamine/Sodium Hydroxide Solution

for nylon demonstration
contains: hexamethylenediamine, 6 grams; sodium hydroxide, 2 grams; distilled water, 100 mL; red vegetable dye added to to give slight pink color.

H0032	100 mL	$5.45

★ **HAZARD ALERT:** Slightly toxic by ingestion; corrosive to body tissue.
Storage: Organic #2
Disposal: #10
Shelf Life: Good
Color: Pink
Odor: None



Technical Note: You will need a second solution to prepare nylon. See sebacoyl chloride/hexane solution or adipoyl chloride/hexane solution for preparation of nylon.

Hexanes

mixture of n-hexane and other isomers
reagent grade
C_6H_{14}
F.W. 86.18

H0046	100 mL	$ 5.90
H0002	500 mL	9.50
H0054	1000 mL	16.90

★ **HAZARD ALERT:** Flammable liquid; dangerous fire risk; respiratory irritant. LD_{50} 28710 mg/kg. TLV 176 mg/m^3.
Storage: Organic #3 in a dedicated flammables cabinet. If one is not available then store in a Flinn *Saf-Stor*® Can.
Disposal: #18a
Shelf Life: Indefinite if stored safely.
Soluble: Acetone, alcohol and ether; not water.
Color: Colorless
Odor: Paint thinner
CAS No. 110-54-3



The Solution May Be a Solution

The less you store of a chemical substance, the less the potential hazard. When you think about it, a practical way to have the least amount of a substance is to have it only as a solution. Flinn pioneered many smaller package sizes, Gramolpaks®, and ready-made solutions. Do these options cost more? Yes, they do, but from a safety, storage, and time-saving perspective, these options will save you money in the long run.

1,6-Hexanediamine

see Hexamethylenediamine

Hexyl Alcohol

1-hexanol

$CH_3(CH_2)_4CH_2OH$	**H0047**	100 mL	**$12.00**
F.W. 102.18	**H0025**	500 mL	**34.55**

★ **HAZARD ALERT:** Moderately toxic by ingestion, inhalation and skin absorption. Severe body tissue irritant. LD_{50} 720 mg/kg.

Storage: Organic #2

Disposal: #18b

Shelf Life: Indefinite

Soluble: Alcohol and ether; slightly in water.

Color: Colorless

Odor: Strong; flower-like

CAS No. 111-27-3



Flinn Gramolpaks® make solution preparation easy.

Hydrobromic Acid

hydrogen bromide, 48% solution in water
ACS reagent

HBr	**H0053**	100 mL	**$30.31**
F.W. 80.91	**H0003**	500 mL	**59.51**

★ **HAZARD ALERT:** Corrosive to body tissue. Severe respiratory hazard. Toxic by ingestion and inhalation. TLV 9.9 mg/m^3 as HBr gas.

Storage: Inorganic #9 in a dedicated acid cabinet. If a dedicated acid cabinet is not available, store in a Flinn *Saf-Cube®*.

Shelf Life: Fair, if stored safely. Light sensitive. Darkens on exposure to light.

Disposal: #24b

Soluble: Water

Color: Amber

Odor: Suffocating; bromine-like.

CAS No. 10035-10-6



Technical Note: Concentrated hydrobromic acid is about 9 M.

Hydrochloric Acid

12 Molar

ACS reagent	**H0031**	100 mL	**$ 6.51**
37 wt %	**H0004**	500 mL	**13.01**
HCl	**H0005**	2.5 liters	**19.61**
F.W. 36.46	* **H0006**	2.5 liters	**22.81**
		(Packaged in PVC-coated bottle)	

★ **HAZARD ALERT:** Highly toxic by ingestion or inhalation; severely corrosive to skin and eyes.

Storage: Inorganic #9 in a dedicated acid cabinet. If one is not available, store in a Flinn *Saf-Cube®*. HCl fumes are singly responsible for destroying many school storage shelves and cabinets. See our special storage tip.

Cap Safety Color Code: Blue

Disposal: #24b

Shelf Life: Good if stored safely.

Soluble: Water

Color: Colorless

Odor: Very strong chlorine

CAS No. 7647-01-0



Incompatability: Avoid storing hydrochloric acid anywhere in the vicinity of formaldehyde. Why? Because a VERY POTENT CARCINOGEN, chloromethoxychloromethane, is formed as hydrochloric acid and formaldehyde react in air. This serious potential problem further emphasizes the need to store hydrochloric acid in a dedicated acid cabinet.

Safety Purchase Suggestion: Buy and store only small package sizes and small quantities. For safety reasons, Flinn offers larger sizes of hydrochloric acid and other hazardous substances in PVC-coated bottles. We have attempted to price the products in these safer containers as low as possible.

*Hydrochloric acid is exactly as described under catalog number H0005 but in a PVC-coated bottle. In the event of breakage, acid and glass shards are safely retained in a PVC outer envelope. *Plas-Pak®* is a safer package for science teachers.

Special Storage Tip

Hydrochloric acid fumes a lot—particularly when warm. These fumes are most responsible for the corrosion damage in your acid storage area.

SOLUTION: Store hydrochloric acid bottle(s) in a tightly sealed plastic bag. **BE SURE** to label the outside of the plastic bag since acid fumes will soon destroy the bottle label. Spray the label on the bottle with Krylon® plastic spray (AP1559, page 906) if you wish to preserve it.

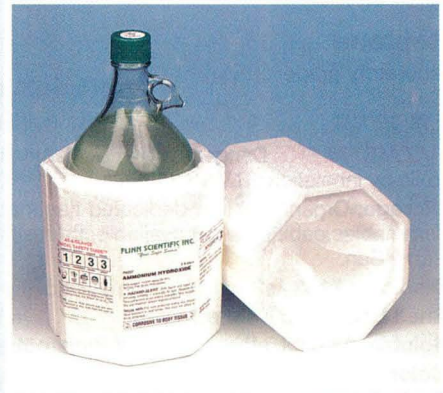
Flinn Acids: The Safer Choice

Hydrochloric acid is an essential part of any chemical laboratory but is also one of the more hazardous. Flinn makes it safer by providing PVC-coated bottles, Flinn *Saf-Cube®*, and premixed solutions.



- **Safer Bottles:** Please order the 2.5 L hydrochloric acid in the *Plas-Pak®* bottle (H0006). These PVC-coated bottles are lifesavers!
- ***Saf-Cube®*:** All 12 M hydrochloric acid bottles are shipped in Flinn *Saf-Cubes* for your protection. Don't throw these valuable containers away. They make great storage containers if no acid cabinet is available.
- **Premixed Solutions:** Consider buying Flinn premixed acid solutions. They save time and are safer to store than concentrated acids. If you make your own solutions…

Always Add Acid to Water!



Hydrochloric Acid, Gramolpak

(as HCl)

1 Molar	* H0039	pkg.	$12.70
0.5 Molar	* H0040	pkg.	9.00
0.1 Molar	* H0042	pkg.	7.65

For hazard alert, storage, disposal, etc., see Hydrochloric Acid, H0031.

*Gramolpak® is a unique package which makes 1 liter with distilled water.



Hydrochloric Acid Solution

6 Molar*	H0033	500 mL	$ 6.91
	H0056	1000 mL	10.91
3 Molar†	H0034	500 mL	6.00
1 Molar†	H0013	500 mL	5.75
	H0057	1000 mL	8.85
0.5 Molar§	H0035	500 mL	5.75
0.25 Molar§	H0041	500 mL	5.75
0.15 Molar§	H0036	500 mL	5.80
0.1 Molar§	H0014	500 mL	5.80

★ HAZARD ALERT: Toxic by ingestion or inhalation; severely corrosive to skin and eyes.

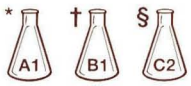
Storage: Inorganic #9 in a dedicated acid cabinet.

Disposal: #24b

Shelf Life: Good

Color: Colorless

Odor: Slight hydrochloric acid



Hydrofluoric Acid

hydrogen fluoride, 48% solution in water

reagent

HF

F.W. 20.01

	H0007	500 mL	$72.33

★ HAZARD ALERT: *Extremely corrosive to skin, eyes and all body tissue. Users must wear appropriate body, hand and face protection. This substance should never be used by students!* Consequences of body exposure may be delayed and not apparent for long periods after the event. If the fluoride ion comes in contact with human nerve endings, the consequences can be extremely severe. We repeat: *Unless you know what you are doing with this substance, avoid its use!* TLV 2.6 mg/m^3 as HF gas.

Storage: Inorganic #9 in a dedicated acid cabinet. If one is not available store in a Flinn *Saf-Cube*®.

Continued on next column.

HYDROFLUORIC ACID *continued*

Disposal: #6

Shelf Life: Good if stored properly and safely.

Soluble: Water

Color: Colorless

Odor: None

CAS No. 7664-39-3



Purchase Suggestion: Avoid storing this substance on school premises. *Never for student use!*

Purchase Suggestion

If you use a lot of gases, consider our refillable gas cylinders. They provide more gas, eliminate disposal problems and save you money.

See page 249 of this Catalog/Reference Manual for more information.



Hydrogen Gas

Lecture bottle	LB1015	2 cu. ft. (56 liters)	$109.21
Refillable cylinder	LB1070	3.6 cu. ft. (100 liters)	214.21

★ HAZARD ALERT: Highly flammable gas; severe fire hazard.

Storage: In an area dedicated to bottled gases and *away from any source of heat or flame.*

Disposal: Completely empty lecture bottle in a good operating fume hood, then follow #26a.

Shelf Life: Indefinite if stored safely.

Soluble: Slightly in water, alcohol and ether.

Color: None

Odor: None

CAS No. 1333-74-0



Special Note: Hydrogen gas lecture bottle is color coded solid yellow.

HOW TO...

Prepare Dilute Acid Solutions

Your lab procedure calls for 500 mL of 2.5 M hydrochloric acid solution. You only have concentrated (12.1 M) hydrochloric acid in your corrosives cabinet. What do you do?

Use the *dilution equation* to calculate the volume of initial (concentrated) solution that must be diluted to give the desired volume of a final (diluted) solution:

Dilution Equation: $M_iV_i = M_fV_f$

M_i = Initial molarity of solution
V_i = Initial volume of solution
M_f = Final molarity of solution
V_f = Final volume of solution

Consider the following example:

What volume of 12.1 M HCl must be diluted to prepare 500 mL of 2.5 M HCl? First, write down the known and unknown quantities in the dilution equation.

M_i = 12.1 M M_f = 2.5 M
V_i = unknown V_f = 500 mL

Next, substitute the known and unknown values into the dilution equation and solve for the unknown quantity:

$$M_iV_i = M_fV_f$$
$$(12.1\ M)V_i = (2.5\ M)(500\ mL)$$
$$V_i = \frac{(2.5\ M)(500\ mL)}{(12.1\ M)} = 103\ mL$$

What does this result tell us? In order to prepare 500 mL of 2.5 M HCl starting from 12.1 M HCl, it is necessary to dilute 103 mL of concentrated HCl to a final volume of 500 mL.

Remember the general rule for diluting acid solutions: ALWAYS ADD ACID TO WATER. Fill a 500-mL volumetric flask about ⅓ full with distilled water (about 150 mL). Working in a HOOD and wearing chemical splash goggles and chemical-resistant gloves and apron, measure 103 mL concentrated HCl into a graduated cylinder. Using a funnel, pour the concentrated acid into the volumetric flask. Swirl to mix the contents, then add distilled water until the liquid level (meniscus) reaches the 500-mL line marked on the volumetric flask.

Hydrogen Peroxide

H_2O_2
F.W. 34.02

30% Reagent*	**H0037**	100 mL	**$ 8.71**
(stabilized)	**H0008**	500 mL	**22.81**
6%†	**H0028**	500 mL	**$ 6.95**
laboratory grade	**H0029**	4 liters	**18.40**
3%§	**H0009**	473 mL	**$ 3.75**
laboratory grade	**H0038**	4 liters	**14.45**

★ **HAZARD ALERT:** Many substances will cause hydrogen peroxide to decompose into water and oxygen gas. It deserves the science teacher's special handling and storage attention. Substance is *severely corrosive* to skin, eyes and respiratory tract; *very strong oxidant.* Dangerous fire and explosion risk. *Do not heat this substance.* Wear appropriate protective clothing. TLV 1.4 mg/m^3.

While a 3% and 6% solution of hydrogen peroxide is very weak, it is still an oxidizer and a skin and eye irritant.

Storage: Inorganic #6. We frequently find 30% hydrogen peroxide stored in school refrigerators. We do not recommend storing any laboratory chemicals in household-type refrigerators. Flinn makes 30% hydrogen peroxide storage safer by packaging it in an expandable accordion bottle. See the special note below.

Disposal: #22a

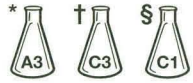
Shelf Life: Fair to poor; stored at room temperature the substance decomposes at approximately 0.5% per year.

Soluble: Water and alcohol

Color: Colorless

Odor: None

CAS No. 7722-84-1



Hydrogen Sulfide, Gas

generating granules
see Aitch-Tu-Ess

Hydroquinone

laboratory grade, crystal
C_6H_4-1,4-$(OH)_2$ **H0011** 100 g **$10.43**
F.W. 110.11

★ **HAZARD ALERT:** Corrosive to skin, eyes and respiratory tract; toxic by ingestion and inhalation. LD_{50} 320 mg/kg. TLV 2 mg/m^3.

Storage: Organic #8

Disposal: #18b

Shelf Life: Poor; keep tightly closed and protected from light. When in solution, it will turn brown as a result of oxidation. Oxidation is very rapid in the presence of alkali.

Soluble: Water, alcohol and ether.

Color: Gray/white

Odor: None

CAS No. 123-31-9



Special Note on Bottle for 30% Hydrogen Peroxide

We have elected to use a special bottle designed specifically for H_2O_2. The bottle looks a little like an accordion. This container is not vented (as our competitors' are) but is tightly sealed. When pressure develops as oxygen is released, the bottle simply expands and increases its height. This container prevents the possibility of the teacher opening a bottle under pressure. The bottle seems larger than one would think necessary but the safety aspects of the package exceed size considerations.

Special 30% H_2O_2 Bottle

Flinn's special accordion H_2O_2 bottle expands as oxygen is released. This unique "safety bottle" keeps the hydrogen peroxide in the bottle yet prevents the possibility of the teacher opening the bottle under pressure. Depend on Flinn for "state of the art" chemical packaging.



Hydroxylamine Hydrochloride

laboratory grade, crystal
$H_2NOH \bullet HCl$ **H0052** 50 g **$ 7.65**
F.W. 69.50 **H0019** 100 g **10.80**

★ **HAZARD ALERT:** Moderately toxic by ingestion; strong tissue irritant. LD_{50} 408 mg/kg.

Storage: Organic #2

Disposal: #26a

Shelf Life: Poor; undergoes rapid decomposition at room temperature and especially in high humidity.

Soluble: Water; glycerol and alcohol; insoluble in ether.

Color: White

Odor: None

CAS No. 5470-11-1



Hydroxy Naphthol Blue

indicator, disodium salt
reagent grade **H0055** 5 g **$12.80**

★ **HAZARD ALERT:** Body tissue irritant.

Storage: Organic #9

Disposal: #26a

Shelf Life: Indefinite

Soluble: Water

Color: Dark blue

Odor: None

CAS No. 165660-27-5



Technical Note: Used as an indicator for Ca^{2+} ions in the EDTA titration of milk.

I

Immersion Oil

RI: 515, PCB free

Low viscosity	**I0051**	0.5 oz.	**$6.60**
150 CS	**I0052**	1 oz.	**8.70**
High viscosity	**I0053**	0.5 oz.	**$6.55**
1250 CS	**I0054**	1 oz.	**8.50**

Storage: Organic #3

Disposal: #18b

Shelf Life: Indefinite

Soluble: Insoluble in water

Color: Colorless or slightly pale yellow

Odor: None



Technical Note: The 0.5 oz. package is a squeeze tube with an integral and convenient applicator nozzle. The 1 oz. package is a bottle with a glass applicator rod built into the cap. Both oils meet or exceed DIN standards and are non-drying and non-hardening. Use low viscosity between objective and slide and high viscosity between the condenser and slide.

1,2,3-Indantrione Monohydrate

see Ninhydrin

IndiAge® Super GX Enzyme



cellulase enzyme formulation
used to demonstrate enzyme washing of blue jeans

I0063	50 g	$9.80

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite if stored in a cool, dry place. Keep container tightly closed.
Soluble: Water
Color: White
Odor: Slight fermentation odor



CAS No. 9012-54-8
Technical Note: Prepare a 2% solution in pH 5 buffer for enzyme-washing experiments.



Indicators

see individual listings or chart on this page

Indigo Carmine

indicator and stain
pH 11.6 blue to 13.0 yellow
$C_{16}H_8N_2Na_2O_8S_2$
F.W. 466.37

I0047	5 g	$ 6.75
I0022	10 g	11.05

★ **HAZARD ALERT:** Slightly toxic by ingestion; body tissue irritant. LD_{50} 2000 mg/kg.
Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and slightly in alcohol.
Color: Violet
Odor: None



CAS No. 860-22-0
C.I. #73015
Technical Note: To make a 0.25% solution, add 0.25 g of indigo carmine to 100 mL of0 50% ethyl alcohol. Prepare fresh for use; solution does not store well. Color of the solution fades on standing.

Indicators, pH Ranges

Indicator	Flinn Catalog Nos.	pH Range	Color Change
Alizarin	A0207	5.5–6.8 & 11.0–12.4	yellow to red red to purple
Alizarin Red S	A0209, A0117	4.6–6.0	yellow to red
Alizarin Yellow R	A0261, A0210, A0136	10.2–12.2	yellow to red
Aniline Blue	A0091	10–13	blue to orange
Brilliant Green	B0164	0–2.6	yellow to green
Bromcresol Green	B0039, B0040	3.8–5.4	yellow to blue
Bromcresol Purple	B0041, B0042	5.2–6.8	yellow to purple
Bromphenol Blue	B0043, B0044	3.0–4.6	yellow to purple
Bromthymol Blue	B0045, B0046	6.0–7.6	yellow to blue
Chlorophenol Red	C0174	5.2–6.8	yellow to red
Clayton Yellow	C0366	11.0–13.0	yellow to red
Congo Red	C0120	3.0–5.0	blue to red
m-Cresol Purple	C0184	1.2–2.8 & 7.4–9.0	red to yellow yellow to purple
Cresol Red	C0123	2.0–3.0 & 7.2–8.8	orange to amber yellow to red
Crystal Violet	C0280, C0124, C0125	0–1.8	yellow to violet-blue
Eosin Y (fluorescent)	E0023	0–3.0	yellow to yellow fluorescent
Erythrosin B (fluorescent)	E0054, E0055	0–3.6	yellow to yellow fluorescent

Indicator	Flinn Catalog Nos.	pH Range	Color Change
Fluorescein (fluorescent)	F0018, F0043	4.0–4.5	colorless to green fluorescent
Fuchsin Acid	F0027	12.0–14.0	red to colorless
Fuchsin, Basic	F0039	1.2–3.0 & 11.6–14.0	purple to red red to colorless
Indigo Carmine	I0047, I0022	11.6–13.0	blue to yellow
Litmus	L0098, L0077	4.5–8.3	red to blue
Malachite Green	M0129	0.0–2.0 & 11.6–14.0	yellow to green blue-green to colorless
Methyl Orange	M0076	3.0–4.4	red to yellow
Methyl Red	M0158, M0081	4.4–6.2	red to yellow
Methyl Violet 2B	M0160, M0083	0.1–2.7	yellow to violet
Neutral Red	N0057	6.8–8.0	red to yellow
Orange G	Q0027	11.5–14.0	yellow to pink
Orange IV	Q0009	1.4–2.6	red to yellow
Phenol Red	P0097, P0188	6.8–8.4	yellow to red
Phenolphthalein	P0017, P0018, P0193	8.2–10.0	colorless to pink
Resazurin	R0012	3.8–6.5	orange to dark violet
Thymol Blue	T0025	1.2–2.8 & 8.0–9.2	red to yellow yellow to blue
Thymolphthalein	T0072, T0073	9.3–10.5	colorless to blue
Universal Indicator	U0001, U0002 U0009, U0011	4–10	chart necessary
Universal Indicator, Rainbow Acid	U0012	1–7	chart necessary

See individual indicator listings in alphabetical sequence in the chemical section of this Catalog/Reference Manual. In many cases, the listing includes ready-made solutions of the above indicators.

Indigo Dye

synthetic indigo dye
$C_{16}H_{10}N_2O_2$ I0057 10 g $15.60
F.W. 262.26

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite; protect from light.
Soluble: Hydrocarbons; insoluble in water.
Color: Dark purple
Odor: None
CAS No. 482-89-3



Indole-3-Acetic Acid

reagent grade
$C_8H_6NCH_2COOH$ I0001 1 g $19.30
F.W. 175.19 I0002 5 g 26.60

Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Alcohol and ether; insoluble in water and chloroform.
Color: Light pink
Odor: None
CAS No. 87-51-4



Technical Note: Use a 1.0–8.0 mg/L solution as a plant growth hormone.

Indole-3-Butyric Acid

reagent grade
$C_{12}H_{13}NO_2$ I0003 1 g $14.45
F.W. 203.24 I0004 5 g 40.75

★ **HAZARD ALERT:** Toxic; may be skin irritant. LD_{50} 100 mg/kg.
Storage: Organic #1 in a Flinn *Chem-Saf*® Bag and then in a locked poisons cabinet.
Disposal: #24a
Shelf Life: Indefinite
Soluble: Alcohol and ketones; insoluble in water.
Color: Off-white
Odor: None
CAS No. 133-32-4



Technical Note: Use a 1.0–10.0 mg/L solution as a plant growth hormone.

Indophenol, Sodium Salt

see Dichloroindophenol, Sodium Salt

Ink, Black

can be used for chromatography
water soluble I0028 2 oz. bottle $6.50

Storage: Miscellaneous non-hazardous organic material.
Soluble: Water
Color: Black
Odor: None



Instant Light

see Chemical Demonstration Kits, page 347

Use a Bag and a Can

Iodine is a good example of a substance that is determined and frequently successful in leaving its bottle. Many of you have seen the localized shelf damage caused as iodine damages metal shelves, shelf clips, etc. Put the bottle in a bag. Use a twist tie to close the bag. Now place the bagged bottle in a clean, fresh paint can. Use cat litter as an absorbent inside the can. Now let the iodine destroy the can instead of your shelves. You can replace the can easier than your shelving.

Intestinal Juice

see Pancreatin Solution

Invertase

enzyme from yeast I0041 25 g $12.80
granular I0030 100 g 32.00

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite if kept dry.
Soluble: Water
Color: Brown
Odor: Dry dog food
CAS No. 9001-57-4

Technical Comment: You can save money by making your own crude invertase solution. Mix one-half package of baker's yeast with approximately 40 mL of distilled (not deionized—distilled) water. Centrifuge this mixture for approximately five minutes. Decant off the top liquid and you have a crude solution of hydrolytic enzyme invertase.



Iodine

resublimed
crystal
I_2
F.W. 253.81

Reagent	I0006	25 g	$11.85
	I0007	100 g	15.73
	I0008	500 g	51.13
Laboratory grade	I0060	100 g	$13.93
	I0061	500 g	42.03

(All above package sizes are packaged in wax-sealed, PVC-coated bottles)

★ **HAZARD ALERT:** Toxic by ingestion or inhalation. Reacts violently with reducing materials, sulfur, iron, alkali metals, metal powders and phosphorus. Irritates the skin; corrosive to eyes and respiratory tract. Inhalation of vapors or ingestion may be fatal. Human LD_{50} 2–4 g/kg. TLV 1.0 mg/m^3.
Storage: Inorganic #2
Disposal: #12a
Shelf Life: Fair, the substance sublimes. Frequently oxidizes metal shelves or metal containers in proximity to the iodine. Store in a Flinn *Chem-Saf*® Bag.
Soluble: Many organic solvents; not water.
Color: Black/purple/black
Odor: Unique; acrid.
CAS No. 7553-56-2

Technical Note: Iodine may be removed from clothing by washing the stain with a 10% solution of sodium thiosulfate—then rinsing with water.
Safety Purchase Suggestion: Iodine diffusion tubes (AP8475) are a great way to safely demonstrate the volatility and properties of iodine gas. Look for diffusion tubes on page 317.

Iodine, Tincture

contains: potassium iodide, iodine, water and ethyl alcohol

I0009 100 mL $ 5.05
I0035 500 mL 10.05

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Contains ethyl alcohol, toxic by ingestion and inhalation; flammable liquid.
Storage: Inorganic #2, store as a flammable liquid.
Disposal: #18a
Shelf Life: Good, if stored safely.
Color: Brown/black
Odor: Iodine and alcohol

Iodine Solution

iodine-iodide

0.1 Molar	I0039	500 mL	$ 9.30
0.05 Molar	I0048	100 mL	$ 7.45
	I0023	500 mL	10.10

(All package sizes packaged in PVC-coated bottles)

★ HAZARD ALERT: Irritating to eyes and skin.
Storage: Inorganic #2
Disposal: #12a
Shelf Life: Fair to poor; store away from heat and direct light.
Color: Brown/red
Odor: Iodine



Iodine–Potassium Iodide Solution

test solution for starch

	I0038	100 mL	$5.10
	I0027	500 mL	6.50

(Both package sizes packaged in PVC-coated bottles)

★ HAZARD ALERT: Irritating to eyes and skin.
Storage: Inorganic #2
Disposal: #12a
Shelf Life: Fair to poor; store away from heat and direct light.
Color: Amber
Odor: Slight iodine



Iodine Solution, Gram

staining solution
iodine-iodide

	G0036	100 mL	$4.95
	G0009	500 mL	8.30

(Both package sizes packaged in PVC-coated bottles)

For hazard alert, storage, disposal, etc., see Iodine–Potassium Iodide Solution, I0038.
Color: Brown
Odor: Iodine



Iodine Solution, Lugol's

Weigerts, vital stain solution
iodine-iodide

	I0036	100 mL	$5.00
	I0010	500 mL	9.30

(Both package sizes packaged in PVC-coated bottles)

For hazard alert, storage, disposal, etc., see Iodine–Potassium Iodide Solution, I0038.
Color: Brown
Odor: Iodine



Ion Exchange Resin

Ion Exchange Resin SBA
strongly basic anion exchange resin, Dowex® 2-X8
20–50 mesh

	I0033	100 g	$ 61.00
	I0034	500 g	113.00

Ion Exchange Resin SAC
strongly acidic cation exchange resin, Dowex® 50X8
50–100 mesh I0043 100 g $ 52.80

Ion Exchange Resin SAC-Na
strongly acidic cation exchange resin, sodium form
for water softening Z0001 500 g $ 16.95

Storage: Miscellaneous organic
Disposal: #26a
Shelf Life: Excellent
Color: Buff or brown
Odor: None



Iron Compounds

see Ferric (Iron III) and Ferrous (Iron II)

Iron, Filings

fine, 50 mesh
Fe, A.W. 55.85

Pure iron	I0011	500 g	$3.45
	I0012	2 kg	9.85
Non-rusting alloy	I0059	500 g	$6.95

Storage: Inorganic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Sulfuric, hydrochloric and cold, dilute nitric acids.
Color: Gray/black
Odor: None
CAS No. 7439-89-6



Technical Note: Pure iron filings quickly oxidize (rust) and can be messy. Flinn's iron alloy metal filings act just like iron filings for magnetism experiments but resist oxidation. Use pure iron filings for iron sulfide or other chemistry experiments.

Iron, Nails

3" long, 10 penny I0032 1 lb $4.35

For storage, disposal, etc., see Iron, Sheet, I0015.



Iron, Powder

Reagent grade	I0013	100 g	$12.85
reduced electrolytic			
Laboratory grade	I0014	500 g	$ 7.25

★ HAZARD ALERT: Metals, in fine powder form, present a serious fire and explosion risk.
Storage: Inorganic #1 in a Flinn *Saf-Stor*® Can.
Disposal: #26a
Shelf Life: Good if kept dry and protected from fire.
Soluble: Sulfuric, hydrochloric and cold, dilute nitric acids.
Color: Gray
Odor: None
CAS No. 7439-89-6



Iron, Sheet

mild steel
12" × 12" × 0.024"
B&S gauge #24 I0015 each $7.35

Storage: Inorganic #1
Disposal: #26a
Shelf Life: Excellent
Color: Gray
Odor: None



Iron, Strips

mild steel
each strip 6" × ½" × 0.024"

I0058 pkg./10 strips $5.30

For storage, disposal, etc., see Iron, Sheet, I0015.



Two Vital Questions to Ask Before Use of Any Chemicals

1. How can this substance hurt me?
2. How can I protect myself against this substance?

Those two simple questions should be asked before you undertake the use of any substance either at home or at school. Read the label and the material safety data sheet (MSDS). The answers to Question #2 will be found in this *Flinn Scientific Catalog/Reference Manual*, our bottle labels, and the material safety data sheets.

Iron, Wire

wire, 18 gauge
1.2 mm diameter (100 cm = 8.8 g)

I0050	25 g	$ 5.30
I0062	100 g	15.85

Storage: Inorganic #1
Disposal: #26a
Shelf Life: Excellent
Color: Gray
Odor: None
CAS No. 7439-89-6



Isoamyl Alcohol

see Isopentyl Alcohol

Isobutanol

see Isobutyl Alcohol



Isobutyl Alcohol

2-methyl-1-propanol; isobutanol
reagent grade
$(CH_3)_2CHCH_2OH$
F.W. 74.12

I0017	500 mL	$12.11

★ **HAZARD ALERT:** Flammable; slightly toxic; skin, eye and respiratory irritant. LD_{50} 2460 mg/kg. TLV 152 mg/m^3.
Storage: Organic #2. Substance attacks plastic containers. Store in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Indefinite
Soluble: Alcohol and ether; partially in water.
Color: Colorless
Odor: Strong; alcohol-like
CAS No. 78-83-1



Isopentyl Alcohol

isoamyl alcohol
reagent grade
$(CH_3)_2CHCH_2CH_2OH$
F.W. 88.15

I0031	100 mL	$10.81
I0018	500 mL	18.01

★ **HAZARD ALERT:** Slightly toxic by ingestion and inhalation; moderate fire risk; may form explosive peroxides, do not distill to dryness. TLV 361 mg/m^3. LD_{50} 1300 mg/kg.
Storage: Organic #2 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Poor. May form explosive peroxides. Avoid prolonged storage.
Soluble: Slightly in water; miscible with alcohol and ether.
Color: Colorless
Odor: Strong, disagreeable; alcohol-like.
CAS No. 123-51-3



Explosive Isopropyl Alcohol?

Age and storage conditions now force the inclusion of isopropyl alcohol into the family of substances that may develop explosive organic peroxides. A high school in Ohio was distilling isopropyl alcohol to dryness. An explosion resulted. Isopropyl alcohol may be the culprit. The cause is still inconclusive. What is the point? The age and storage conditions of the substance may have contributed to the problem. Buy chemicals from people responsible enough to date their products. Flinn date labels all of its chemicals.

Isopropyl Alcohol

2-propanol, isopropanol
reagent grade, 99% purity
$(CH_3)_2CHOH$
F.W. 60.10

I0019	500 mL	$ 4.35
I0020	4 liters	19.91

★ **HAZARD ALERT:** Flammable liquid; fire hazard; slightly toxic by ingestion and inhalation. LD_{50} 5045 mg/kg. TLV 983 mg/m^3.
Storage: Organic #2 in a dedicated flammables cabinet. If a flammables cabinet is not available store in a Flinn *Saf-Stor*® Can.
Disposal: #18a
Shelf Life: Fair. May form explosive peroxides; avoid prolonged storage and do not distill to dryness. Explosions have happened in high schools with this substance. If in doubt about age or condition of your isopropyl alcohol, do not use.
Soluble: Water, alcohol and ether.
Color: Colorless
Odor: Rubbing alcohol
CAS No. 67-63-0



Isopropyl Alcohol

70% rubbing alcohol
laboratory grade

I0021	500 mL	$ 5.50
I0037	4 liters	19.81

★ **HAZARD ALERT:** Moderate fire risk; flammable liquid; slightly toxic by ingestion and inhalation.
Storage: Organic #2 in a dedicated flammables cabinet. If a flammables cabinet is not available store in a Flinn *Saf-Stor*® Can.
Disposal: #18a
Shelf Life: Fair
Soluble: Water
Color: Colorless
Odor: Rubbing alcohol



Isovaleric Acid

isopentanoic acid, 3-methylbutyric acid
laboratory grade
$(CH_3)_2CHCH_2COOH$
F.W. 102.13

I0056	25 mL	$13.50

★ **HAZARD ALERT:** Moderately toxic by ingestion and inhalation and skin absorption. Corrosive to body tissue, especially mucous membranes. Avoid all body tissue contact. Combustible liquid. LD_{50} 2000 mg/kg.
Storage: Organic #1
Disposal: #24a
Soluble: Slightly soluble in water. Soluble in alcohol and other organic solvents.
Color: Colorless
Odor: Rancid cheese
CAS No. 503-74-2
Technical Note: Use to prepare isoamyl isovalerate, an apple-scented ester.



J

Janus Green B

biological stain
(supravital stain)

J0001	5 g	$42.00

Storage: Organic #9
Disposal: #5
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Black/green
Odor: None
CAS No. 2869-83-2
C.I. #11050



Jeweler's Rouge

see Ferric Oxide, Red

K

Kaolin
china clay
aluminum silicate hydroxide

K0001 500 g $9.05

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Insoluble in water and dilute acids.
Color: Off-white
Odor: None
CAS No. 1332-58-7



Kerosene
odorless

K0002 500 mL $ 6.80
K0005 4 liters 28.05

★ **HAZARD ALERT:** Moderate fire risk; moderately toxic by ingestion, inhalation, and skin absorption.
Storage: Organic #3 preferably in a flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Excellent if stored safely.
Soluble: Many organic solvents.
Color: Colorless
Odor: Oil
CAS No. 8008-20-6



Kinetin
6-furfurylaminopurine, a cytokinin
$C_{10}H_9N_5O$
F.W. 215.21

K0006 500 mg $38.25

Storage: Organic #2
Disposal: #5
Shelf Life: Indefinite.
Soluble: Slightly soluble in cold water.
Color: White
Odor: Odorless
CAS No. 525-79-1



Technical Note: Use 0.1 to 5.0 mg/L solution as a plant growth promoter.

Knop's Solution
for culturing algae
contains: potassium nitrate, potassium phosphate dibasic, calcium nitrate, magnesium sulfate and distilled water.

K0003 500 mL $8.65

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Technical Note: User should add 10 grams each of agar and glucose to 500 mL of Knop's solution. Shake well before using.

L

Laboratory Cleaners
see Cleaners

Lactic Acid
laboratory grade, 85% aqueous solution
$CH_3CHOHCOOH$
F.W. 90.08

L0001 100 mL $7.40

★ **HAZARD ALERT:** Corrosive liquid; corrosive to eyes; irritates skin and respiratory tract. LD_{50} 3730 mg/kg.
Storage: Organic #1
Disposal: #24a

Continued on next column.

LACTIC ACID *continued*

Shelf Life: Substance hygroscopic; store in a Flinn *Chem-Saf*® Bag.
Soluble: Miscible with water, alcohol and glycerin.
Color: Colorless
Odor: None
CAS No. 50-21-5



Lactose
laboratory grade, powder
$C_{12}H_{22}O_{11} \bullet H_2O$
F.W. 360.32

L0002 500 g $9.05

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; insoluble or only slightly soluble in many organic solvents.
Color: White
Odor: None
CAS No. 63-42-3



Lampblack
see Charcoal

Lanolin
wool fat, anhydrous
laboratory grade

L0051 100 g $ 9.35
L0003 500 g 17.10

Storage: Organic #3
Disposal: #26a
Shelf Life: Good if kept cool and dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: Yellowish
Odor: Shoe polish
CAS No. 8006-54-0





See page 37 for a detailed explanation of the Flinn Hazard and Usefulness Code.

Lanthanum Nitrate
laboratory grade, large crystal
$La(NO_3)_3 \bullet 5H_2O$
F.W. 415.01

L0086 25 g $18.80
L0087 100 g 54.00

★ **HAZARD ALERT:** Strong oxidizer; may be skin and body tissue irritant.
Storage: Inorganic #3
Disposal: #12a
Shelf Life: Poor; hygroscopic.
Soluble: Alcohol, water and acids.
Color: White
Odor: Slight nitric acid
CAS No. 15878-72-5



How Much Can You Stand?

Various concentrations of chemicals are encountered in a "typical" school science laboratory atmosphere. Knowing what concentrations create unhealthy effects is not an easy task. An effort has been made to quantify exposure levels based on extensive experience and data. These levels are called Permissible Exposure Levels (PEL). These PEL's are sometimes called Threshold Limit Values (TLV). Please review the section of this catalog dedicated to Threshold Limit Values (TLV) on pages 928–929.

Lanthanum Nitrate Solution

0.1 Molar
(as $La(NO_3)_3 \cdot 5H_2O$) **L0099** 100 mL **$13.60**
Storage: Inorganic #3
Disposal: #12a
Shelf Life: Indefinite
Color: Colorless
Odor: Slight nitric acid



Lard

see Tallow

Latex

liquid, compounded **L0004** 500 mL **$12.30**
L0110 1 liter **21.80**
L0111 4 liters **84.70**

★ **HAZARD ALERT:** Possible allergen and skin irritant.
Storage: Organic #3
Disposal: #26b
Shelf Life: Fair; will turn pink if exposed to light.
Soluble: Most common organic solvents.
Color: White or light pink
Odor: Slight ammonia
CAS No. None assigned



Technical Note: Compounded latex has additives that prevent discoloration, aging, and deterioration.

Laundry Bluing

see Bluing, Laundry

Lauric Acid

dodecanoic acid
laboratory grade, flake
$CH_3(CH_2)_{10}COOH$ **L0052** 100 g **$ 8.20**
F.W. 200.32 **L0044** 500 g **12.15**
M.P. 43–45 °C
Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Insoluble in water; soluble in ether and benzene.
Color: White
Odor: Candle wax
CAS No. 143-07-7



Lauroyl Peroxide

dodecanoyl peroxide
laboratory grade, flake
$[CH_3(CH_2)_{10}CO]_2O_2$ **L0085** 5 g **$6.60**
F.W. 398.63

★ **HAZARD ALERT:** Slightly toxic by ingestion and inhalation. Severe skin irritant. Strong oxidizer; will ignite organic material. Dangerous fire and explosion risk.
Storage: Organic #6
Disposal: #22b
Shelf Life: Fair to poor; acquire only small quantities.

Continued on next column.

How Can It Hurt You?

This is a key question you must routinely ask about all chemical substances. Lead is an example of a substance we routinely encounter in our daily lives outside the laboratory. If you or your students will be exposed to lead as a dust or a fume then you need to seek a means of avoiding that contact. How? Air dilution (ventilation) and/or a fume hood. Certainly lead and its compounds should be of concern to you—but be realistic about the answer to that question, i.e., how can it hurt you?

LAUROYL PEROXIDE *continued*

Soluble: Many organic solvents, partially alcohol; not water.
Color: White
Odor: Candle wax
CAS No. 105-74-8



Lauryl Alcohol

see Dodecyl Alcohol

Lead, Foil

Pb
A.W. 207.19
0.006″ thick
L0109 250 g (3″ × 70″) **$11.35**
L0005 500 g (approx. 3″ × 140″) **18.60**
Storage: Inorganic #1
Disposal: #27d
Shelf Life: Indefinite
Soluble: Dilute nitric acid; not water.
Color: Silvery/gray
Odor: None
CAS No. 7439-92-1



Lead, Granular

reagent grade **L0080** 100 g **$ 8.25**
L0006 500 g **21.35**

★ **HAZARD ALERT:** Lead as a dust or a fume is extremely toxic.
For storage, disposal, etc., see Lead, Foil, L0109.
Color: Silvery/gray
Odor: None



Lead, Powder

laboratory grade **L0081** 100 g **$ 7.35**
L0007 500 g **16.85**

★ **HAZARD ALERT:** Lead as a powder is extremely toxic by inhalation and ingestion. *Possible carcinogen* as a fume or dust. Take all precautions when working with lead powder. TLV 0.05 mg/m^3 as dust and fume.
For disposal, etc., see Lead, Foil, L0109.
Storage: Inorganic #1. Store in a Flinn *Chem-Saf*® Bag.
Color: Gray
Odor: None



Lead, Sheet

1/32″ thick **L0088** 250 g (6″ × 7″) **$ 6.70**
L0072 500 g (6″ × 14″) **9.25**
1/16″ thick **L0089** 250 g (3½″ × 6″) **$ 6.90**
L0009 500 g (6″ × 7″) **13.05**
For storage, disposal, etc., see Lead, Foil, L0109.
Color: Gray
Odor: None



Lead, Shot

Approx. 2 mm diam. **L0090** 250 g **$6.75**
L0008 500 g **7.90**
For storage, disposal, etc., see Lead, Foil, L0109.
Color: Gray
Odor: None



Lead, Strips

15 × 1 cm, 0.8 mm thick **L0065** pkg./6 **$5.45**
For storage, disposal, etc., see Lead, Foil, L0109.
Color: Gray
Odor: None



Lead, Wire

.125" (approx. 3.1 mm diam.)
16.25 feet per pound
Pb — L0064 — 1 lb spool — $7.95

For storage, disposal, etc., see Lead, Foil, L0109.
Color: Gray
Odor: None



Lead Acetate

lead(II) acetate
laboratory grade, flake
$Pb(C_2H_3O_2)_2 \cdot 3H_2O$ — L0091 — 50 g — $ 6.23
F.W. 379.34 — L0073 — 100 g — 8.93
L0010 — 500 g — 14.93

★ **HAZARD ALERT:** A *possible carcinogen;* eye, skin and respiratory irritant; moderately toxic.
Storage: Inorganic #2 in a Flinn *Chem-Saf*® Bag. *Avoid the dispersion of the dust of this substance!*
Disposal: #27f
Shelf Life: Fair to poor; absorbs carbon dioxide when exposed to air becoming insoluble in water. Store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, glycerin and slightly in alcohol.
Color: White
Odor: Strong vinegar
CAS No. 6080-56-4



Lead Acetate, Gramolpak

0.1 Molar
(as $Pb(C_2H_3O_2)_2 \cdot 3H_2O$) — * L0102 — pkg. — $5.15

For hazard alert, storage, disposal, etc., see Lead Acetate, L0091.
*Gramolpak® is a unique package which makes 1 liter with distilled water.





Lead Acetate Solution

0.1 Molar
(as $Pb(C_2H_3O_2)_2 \cdot 3H_2O$) — L0100 — 500 mL — $6.45

★ **HAZARD ALERT:** A *possible carcinogen;* eye and skin irritant; moderately toxic by ingestion.
Storage: Inorganic #2 in a Flinn *Chem-Saf*® Bag.
Disposal: #27f
Shelf Life: Fair
Color: Colorless
Odor: Slight vinegar



Lead Carbonate

lead(II) carbonate, basic
laboratory grade, powder
$2PbCO_3 \cdot Pb(OH)_2$ — L0092 — 100 g — $ 7.45
F.W. 775.10 — L0036 — 500 g — 11.10

★ **HAZARD ALERT:** Moderately toxic by inhalation and ingestion; skin, eye and respiratory tract irritant. *Possible carcinogen.*
Storage: Inorganic #4 in a Flinn *Chem-Saf*® Bag.
Disposal: #27f
Shelf Life: Indefinite
Soluble: Acids; not water.
Color: White
Odor: None
CAS No. 1319-46-6



Lead Chloride

lead(II) chloride
reagent, powder — L0093 — 25 g — $ 8.93
$PbCl_2$ — L0053 — 100 g — 15.03
F.W. 278.12 — L0011 — 250 g — 21.03

★ **HAZARD ALERT:** Moderately toxic by inhalation and ingestion. *Possible carcinogen.*

Continued on next column.

LEAD CHLORIDE *continued*

Storage: Inorganic #2 in a Flinn *Chem-Saf*® Bag.
Disposal: #27f
Shelf Life: Indefinite
Soluble: Slightly in hot water; insoluble in cold water and alcohol.
Color: White
Odor: None
CAS No. 7758-95-4



Lead Chloride Solution

saturated
approximately 12 g/liter
L0066 — 500 mL — $7.00

For hazard alert, storage, disposal, etc., see Lead Chloride, L0093.
Color: Colorless
Odor: None



Lead Dioxide

lead(IV) oxide; lead peroxide
laboratory grade, powder
PbO_2 — L0012 — 100 g — $ 6.71
F.W. 239.21 — L0013 — 500 g — 19.71

★ **HAZARD ALERT:** Moderately toxic by inhalation and ingestion; severe body tissue irritant; avoid all body contact. *Possible carcinogen.*
Storage: Inorganic #4 in a Flinn *Chem-Saf*® Bag.
Disposal: #27d
Shelf Life: Indefinite if stored safely.
Soluble: Acetic acid; not water or alcohol.
Color: Dark brown
Odor: None
CAS No. 1309-60-0



Lead Monoxide

see Lead Oxide, Mono

Lead Nitrate

lead(II) nitrate
$Pb(NO_3)_2$
F.W. 331.20
Reagent — L0014 — 100 g — $ 6.53
crystal — L0015 — 500 g — 15.33
L0016 — 2 kg — 54.93
Laboratory grade — L0060 — 500 g — $ 9.63
powder — L0061 — 2 kg — 42.03

★ **HAZARD ALERT:** Moderately toxic by inhalation and ingestion; strong oxidant; dangerous fire risk in contact with organic material; body tissue irritant. *Possible carcinogen.*
Storage: Inorganic #3
Disposal: #27f
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: White
Odor: Slight nitric acid
CAS No. 10099-74-8



No Food in the Laboratory

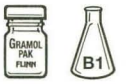
Certainly, there are items of a consumable nature among the laboratory chemicals found on your shelf in the chemical storeroom. Sugar, corn syrup, lemon juice, etc., are just a few examples. Each time one of these substances is used in the laboratory, take that occasion to reinforce the fact that in the lab setting, it is a chemical. Food is never consumed in a laboratory. Is it time to say good-bye to the coffee pot in the chemical storeroom? You set the example.

Lead Nitrate, Gramolpak

0.1 Molar
(as $Pb(NO_3)_2$) * **L0104** pkg. **$7.65**

For hazard alert, storage, disposal, etc., see Lead Nitrate, L0014.

*Gramolpak® is a unique package which makes 1 liter with distilled water.



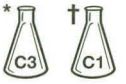
Lead Nitrate Solution

(as $Pb(NO_3)_2$)

1 Molar*	**L0067**	500 mL	**$7.30**
0.5 Molar†	**L0068**	500 mL	**7.15**
0.1 Molar†	**L0069**	500 mL	**6.10**

For hazard alert, storage, disposal, etc., see Lead Nitrate, L0014.

Color: Clear
Odor: None



Lead Oxide, Di

see Lead Dioxide

Lead (IV) Oxide

see Lead Dioxide

CAN'T FIND A CHEMICAL?
1-800-452-1261
PLEASE CALL US!

Lead Oxide, Mono

lead(II) oxide, yellow
litharge
laboratory grade

PbO	**L0082**	100 g	**$ 7.80**
F.W. 223.21	**L0018**	500 g	**12.10**

★ **HAZARD ALERT:** Moderately toxic by ingestion and inhalation. *Possible carcinogen.*
Storage: Inorganic #4 in a Flinn *Chem-Saf®* Bag.
Disposal: #27d
Shelf Life: Indefinite
Soluble: Acids and alkalies; insoluble in water.
Color: Yellow/orange
Odor: None
CAS No. 1317-36-8



Lead Oxide, Tetra

lead (II,III) oxide, red
laboratory grade

Pb_3O_4	**L0083**	100 g	**$ 5.50**
F.W. 685.63	**L0017**	500 g	**11.60**

★ **HAZARD ALERT:** Moderately toxic by ingestion or inhalation; body tissue irritant; an oxidizer. *Possible carcinogen.*
Storage: Inorganic #4
Disposal: #27d
Shelf Life: Indefinite
Soluble: Partly in acids; insoluble in water.
Color: Orange/red
Odor: None
CAS No. 1314-41-6



Lead Peroxide

see Lead Dioxide

Does Your Eyewash Work?

Safety equipment is there for you and your students' protection. Make sure it is in good working condition at all times. Set up a regular inspection, testing, and maintenance program for all your safety equipment. Don't wait for an accident to happen to check your safety equipment.

Lead Sulfate

lead(II) sulfate
reagent grade, powder

$PbSO_4$	**L0054**	25 g	**$ 9.40**
F.W. 303.28	**L0037**	100 g	**26.30**

★ **HAZARD ALERT:** Moderately toxic by ingestion and inhalation; corrosive to body tissue. *Possible carcinogen.*
Storage: Inorganic #2 in a Flinn *Chem-Saf®* Bag.
Disposal: #27f
Shelf Life: Indefinite
Soluble: Sodium hydroxide solution
Color: White
Odor: None
CAS No. 7446-14-2



Lead Sulfide

native galena

PbS	**L0055**	100 g	**$ 7.05**
F.W. 239.25	**L0019**	500 g	**12.00**

★ **HAZARD ALERT:** Moderately toxic by ingestion and inhalation. *Possible carcinogen.*
Storage: Inorganic #5
Disposal: #26a
Shelf Life: Indefinite
Soluble: Acids; not alkali or water.
Color: Gray/black
Odor: None
CAS No. 314-87-0



Lead Tetroxide

see Lead Oxide, Tetra

Lemon Juice

L0042 8 oz. **$3.30**

Storage: Organic #1
Disposal: #26b
Shelf Life: Limited; keep cool after opening.
Soluble: Water
Color: Yellow
Odor: Lemon



Levulose

D-fructose
laboratory grade, crystal

$C_6H_{12}O_6$	**L0020**	100 g	**$ 7.25**
F.W. 180.16	**L0074**	500 g	**19.20**

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water, alcohol and ether.
Color: White
Odor: None
CAS No. 57-48-7



Licorice

glycyrrhiza extract	**L0062**	25 g	**$4.75**
dry powder	**L0063**	100 g	**9.40**

Storage: Organic #2
Disposal: #26a
Shelf Life: Poor unless kept very dry. Store in a Flinn *Chem-Saf®* Bag.
Soluble: Hot water
Color: Brown
Odor: Licorice candy



Light Sticks

see page 258

Lime, Slaked

see Calcium Hydroxide

Lime Water Solution

calcium hydroxide saturated solution
140 mg/100 mL — L0021 — 500 mL — $3.70
L0022 — 4 liters — 9.20

Storage: Inorganic #4
Disposal: #10
Shelf Life: Fair to poor; absorbs carbon dioxide from air. Keep your container tightly closed.
Color: Clear and colorless if left undisturbed
Odor: None
Technical Note: Use for detecting carbon dioxide gas. The solution always contains some undissolved calcium hydroxide.



Lime Water Tablets

bottle of 100 tablets — L0038 — pkg./100 — $6.25

Storage: Inorganic #4
Disposal: #10
Shelf Life: Superior to ready-made solution.
Soluble: Water (partially)
Color: White
Odor: None
Technical Note: Each tablet makes 100 mL of solution when dissolved in water. For best results, crush the tablet and allow the solution to sit overnight before use. Do not heat or boil the solution.



Linseed Oil

boiled — L0023 — 500 mL — $7.65

Storage: Organic #3
Disposal: #26b
Shelf Life: Indefinite
Soluble: Slightly in alcohol and in many common organic solvents.
Color: Deep amber
Odor: Oil
CAS No. 8001-26-1



Lipase

enzyme, powder — L0056 — 25 g — $14.30
L0039 — 100 g — 41.95

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Buff
Odor: Decaying flesh



Liqui-Nox®

see Cleaners

Lithium

sticks — L0057 — 2.5 g — $14.23
Li — L0024 — 10 g — 26.13
A.W. 6.94
(Both package sizes packaged under mineral oil in PVC-coated bottles, and then in a metal can for safer storage.)

★ **HAZARD ALERT:** Dangerous; water-reactive; explosion risk; flammable solid. Use a Class D fire extinguisher like Flinn *Met-L-X*® or have a generous supply of dry sand to use as a fire extinguisher. Corrosive to skin, eyes and respiratory tract.
Storage: Inorganic #1 under dry kerosene or dry oil. Store in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can.
Disposal: #3
Shelf Life: Indefinite if stored safely. Do not store or use near water.
Soluble: In water and acids releasing hydrogen gas.
Color: Silver/white
Odor: None
CAS No. 7439-93-2



Lithium Carbonate

laboratory grade, powder
Li_2CO_3 — L0094 — 50 g — $10.00
F.W. 73.89 — L0025 — 100 g — 13.95

★ **HAZARD ALERT:** Strong base when dissolved in water; substance is corrosive to eyes and respiratory tract. Moderately toxic. LD_{50} 525 mg/kg.
Storage: Inorganic #4
Disposal: #10
Shelf Life: Poor; substance hygroscopic.
Soluble: Slightly in water; insoluble in alcohol; soluble in dilute acid.
Color: White
Odor: None
CAS No. 554-13-2



Lithium Carbonate Solution

0.1 Molar
(as Li_2CO_3) — L0101 — 500 mL — $6.10

★ **HAZARD ALERT:** Corrosive liquid; skin burns are possible; very dangerous to eyes; wear face and eye protection. Wear gloves.
Storage: Inorganic #4
Disposal: #10
Shelf Life: Indefinite
Color: Colorless
Odor: None



Lithium Chloride

reagent grade, granular — L0095 — 50 g — $ 6.90
LiCl — L0026 — 100 g — 9.70
F.W. 42.40 — L0075 — 500 g — 23.95

★ **HAZARD ALERT:** Moderately toxic by ingestion. LD_{50} 526 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; substance deliquescent; one of the most hygroscopic substances; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, alcohol
Color: White
Odor: None
CAS No. 7447-41-8



Lithium Chloride, Gramolpak

0.1 Molar
(as LiCl) — * L0105 — pkg. — $7.20

For storage, disposal, etc., see Lithium Chloride, L0095.
*Gramolpak® is a unique package which makes 1 liter with distilled water.



Lithium Chloride Solution

1 Molar
(as LiCl) — L0096 — 500 mL — $4.90

For storage, disposal, etc., see Lithium Chloride, L0095.
Color: Colorless
Odor: None



Before a Lab Even Starts

Many safety-conscious science teachers require students to pass a prelab quiz before starting any lab activity. The prelab quiz forces students to understand laboratory and safety procedures before they even start. According to a recent teacher survey, the number-one reason for accidents in the science lab was "students' failure to carefully read and understand laboratory activity instructions." A prelab quiz may help solve this problem.

Lithium Hydroxide

reagent grade, fine crystal
$LiOH \cdot H_2O$ **L0047** 100 g **$13.10**
F.W. 41.96

★ **HAZARD ALERT:** A strong basic substance; water solutions are strong irritants; corrosive to the eyes, skin and respiratory tract.

Storage: Inorganic #4 in a Flinn *Chem-Saf*® Bag.
Disposal: #10
Shelf Life: Poor; substance hygroscopic; absorbs CO_2 and water from the air; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 1310-66-3



Lithium Nitrate

reagent grade, crystal	**L0097**	50 g	**$ 8.51**
$LiNO_3$	**L0027**	100 g	**12.31**
F.W. 68.95	**L0076**	500 g	**39.31**

★ **HAZARD ALERT:** Strong oxidant. Risk of explosion when shocked or heated. Do not grind or pulverize. Body tissue irritant.

Storage: Inorganic #3 in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can.
Disposal: #26a
Shelf Life: Indefinite if stored safely.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 7790-69-4





Lithium Nitrate, Gramolpak

0.1 Molar
(as $LiNO_3$) * **L0107** pkg. **$4.80**

For hazard alert, storage, disposal, etc., see Lithium Nitrate, L0097.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Lithium Nitrate Solution

0.5 Molar
(as $LiNO_3$) **L0071** 500 mL **$6.20**

Storage: Inorganic #3
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: None



Biological Solutions and Alcohol

Ethyl alcohol is a common ingredient of many biological solutions. Alcohols tend to remove or "de-fat" the natural oils in your skin. Those natural oils offer some protection against skin contact chemical absorption. Yes, you have an invisible pair of gloves so-to-speak which are removed by alcohol. If the substance you are using is hazardous by skin absorption and also contains alcohol, absorption may be accelerated as alcohol de-fats your skin. The solution is to wear gloves.

Lithium Sulfate

reagent grade, crystal
$Li_2SO_4 \cdot H_2O$ **L0084** 25 g **$ 8.65**
F.W. 127.96 **L0040** 100 g **20.70**

★ **HAZARD ALERT:** Slightly toxic. LD_{50} 1190 mg/kg.

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: White
Odor: None
CAS No. 10102-25-7



Litmus Papers

see Test Papers, beginning on page 298

Litmus

indicator
pH 4.5 red to 8.3 blue **L0098** 10 g **$ 8.05**
L0077 25 g **15.50**

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite if bottle kept tightly closed. Store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: Dark blue
Odor: Decaying plant
CAS No. 1393-92-6



Litmus Solution

0.5% aqueous
indicator solution **L0028** 500 mL **$11.00**

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite if kept tightly closed. Store in a Flinn *Chem-Saf*® Bag.
Color: Blue
Odor: Cabbage-like



Liver of Sulfur

see Potash, Sulfurated

Loeffler's Methylene Blue

see Methylene Blue Solution, Loeffler's

Lugol's Iodine Solution

see Iodine Solution, Lugol's

Lull-A-Fly©

triethylamine with a scent added
FB1438 vial **$8.90**

★ **HAZARD ALERT:** Flammable liquid; moderately toxic by ingestion and inhalation; use only in a *well-ventilated area;* corrosive to eyes or skin.

Storage: Organic #2
Disposal: #5
Shelf Life: Indefinite
Soluble: Alcohol and water
Color: Colorless
Odor: Licorice



Technical Note: The scent is added to reduce the undesirable ammonia odor. This substance does not act to anesthetize *Drosophila* as quickly or easily as ether. If the instructions are followed carefully, it is possible to perfect the anesthetic process. If you have tried other ether substitutes and did not like them, you will not like Lull-A-Fly since the material is the same, i.e., triethylamine. However, Lull-A-Fly is a much safer substance than ether.

Do You Need Exciting Chemiluminescence Activities?

Try a Flinn Chemical Demonstration kit. They contain instructions, teacher notes, and all the chemicals you need to perform the demonstration seven times. The following chemiluminescence demonstrations can be found on pages 346–347.

AP8983	Chemiluminescence Ammonia Fountain	**$36.20**
AP8627	Cool Light	**23.60**
AP8978	Energetic Light	**17.95**
AP8926	Fountain of Light	**29.81**
AP9118	Instant Light	**9.45**

Flinn Chemical Demonstration kits are guaranteed to work and will save you time and money. Try one today!

Luminol

3-aminophthalhydrazide
laboratory grade
$C_8H_7N_3O_2$
F.W. 177.17

L0031	1 g	**$ 8.75**
L0078	5 g	**25.45**

Storage: Organic #2
Disposal: #5
Shelf Life: Poor
Soluble: Alcohol
Color: Tan/yellow
Odor: None
CAS No. 521-31-3



Technical Note: Reagent for detection of copper, iron, peroxides, cyanides. Oxidation results in a striking emission of light—chemiluminescence.

Lycopodium

powder

Reagent	**L0059**	25 g	**$ 7.35**
	L0033	100 g	**15.91**
	L0034	500 g	**60.91**
Laboratory grade	**L0112**	100 g	**$12.61**
	L0113	500 g	**47.41**

★ HAZARD ALERT: Highly flammable powder. Possible allergen.
Storage: Organic #2 in a Flinn *Saf-Stor*® Can.
Disposal: #26a
Shelf Life: Indefinite if stored properly.
Soluble: Generally insoluble in water and organic solvents.
Color: Yellow/white
Odor: Fresh cut wood



DL-Lysine HCl

amino acid
powder

L0041	25 g	**$27.95**

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 70-54-2



Lysol®

disinfectant

L0035	12 oz.	**$6.20**

Storage: Organic #8
Disposal: Dilute and place down the sink drain.
Shelf Life: Indefinite
Soluble: Water
Color: Brown/amber
Odor: Phenol



Lysozyme

antibiotic enzyme
Lyophilized, salt free

L0050	1 g	**$27.65**
(Packaged in PVC-coated bottles)		

Storage: Organic #2
Disposal: #26a
Shelf Life: Good if stored at or below 25 °C under dry conditions; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White
Odor: Sewage



M

MacConkey Agar

culture media

M0209	100 g	**$29.30**

Storage: Miscellaneous, nonhazardous organic material.
Disposal: #26a
Shelf Life: Must be kept dry.
Soluble: Water
Color: Buff
Odor: Strong, musty



Technical Note: For the isolation of organisms capable of fermenting lactose. Mix 50 g of agar with 1000 mL of water. Bring to a boil and stir to dissolve completely. Sterilize at 121 °C at 15 lb of pressure for 15 minutes.

Magnesia

see Magnesium Oxide

Magnesium Detection Reagent

qualitative
see 4-(p-Nitrophenylazo) resorcinol

Magnesium, Powder

laboratory grade
Mg
A.W. 24.31

M0145	25 g	**$ 6.60**
(Packed in PVC-coated bottles)		
M0002	100 g	**11.31**

★ HAZARD ALERT: Powder form of this substance is a serious fire hazard; keep either dry sand or Flinn *Met-L-X*® available to use as a fire extinguisher.
Storage: Inorganic #1 in a Flinn *Saf-Stor*® Can.
Disposal: #26a
Shelf Life: Indefinite if stored safely.
Soluble: Acids; not water.
Color: Light gray
Odor: None
CAS No. 7439-95-4



Goggle Sanitizing

You may be lucky enough to afford an ultraviolet sanitizing cabinet. If not, Lysol®, found listed on this page, will do a great job of killing a wide variety of harmful microorganisms. Lysol kills gram positive and negative bacteria including pseudomonas; staphylococcus and streptococcus; lipophillic viruses such as influenza virus A-2; herpes simplex; vaccinia and adeno type 2. Lysol is a concentrate. Dilute the Lysol in a bucketful of deionized water, immerse the goggles, and allow them to air dry.

Magnesium, Ribbon

0.15 × 3.2 mm
Mg
A.W. 24.31

M0139	12.5 g (roll approx. 45 ft. long)	$ 9.90
M0001	25 g (roll approx. 90 ft. long)	12.00

★ **HAZARD ALERT:** Flammable solid; burns with an intense flame; keep either dry sand or Flinn *Met-L-X*® available to use as a fire extinguisher.
Storage: Inorganic #1
Disposal: #26a
Shelf Life: Indefinite if stored safely.
Soluble: Acids; not water.
Color: Silver/gray
Odor: None
CAS No. 7439-95-4



Magnesium, Turnings

reagent grade
for Grignard reactions
Mg
A.W. 24.31

M0112	25 g	$ 6.40
M0004	100 g	13.11

★ **HAZARD ALERT:** Flammable solid; burns with intense flame.
Storage: Inorganic #1 in a Flinn *Saf-Stor*® Can.
Disposal: #26a
Shelf Life: Indefinite if stored safely.
Soluble: Acids; not water.
Color: Silver/gray
Odor: None
CAS No. 7439-95-4



Magnesium Acetate

laboratory grade, crystal
$Mg(C_2H_3O_2)_2 \cdot 4H_2O$
F.W. 214.46

M0127	25 g	$12.10
M0005	100 g	36.75

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; substance hygroscopic.
Soluble: Water and dilute alcohol
Color: White
Odor: Slight vinegar
CAS No. 16674-78-5



Magnesium Bromide

reagent grade, crystal
$MgBr_2 \cdot 6H_2O$
F.W. 292.25

M0111	25 g	$10.30
M0097	100 g	25.85

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; very deliquescent substance; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; slightly in alcohol
Color: White
Odor: None
CAS No. 13446-53-2



In-service Topics

A school district or science department may be seeking good topics for in-service sessions. We suggest two topics:

A. Have a lawyer, experienced in tort law, address your group about your legal responsibilities.
B. Invite the local fire department to teach science instructors how to use a fire extinguisher and employ evacuation techniques.

Magnesium Bromide Solution

0.1 Molar
(as $MgBr_2 \cdot 6H_2O$) M0120 500 mL $9.75
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Magnesium Carbonate

laboratory grade
$4MgCO_3 \cdot Mg(OH)_2 \cdot 5H_2O$
F.W. 485.74

Powder	M0128	100 g	$ 7.65
	M0006	500 g	14.70
Blocks	M0007	100 g	$ 7.30
(3½" × 3½" × 1¾")	M0008	500 g	21.65

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Acids; slightly in water; insoluble in alcohol.
Color: White
Odor: None
CAS No. 56378-72-4





See page 37 for a detailed explanation of the Flinn Hazard and Usefulness Code.

Magnesium Chloride

$MgCl_2 \cdot 6H_2O$
F.W. 203.33

Reagent	M0146	50 g	$ 4.55
crystal	M0009	100 g	8.70
	M0010	500 g	14.95
Laboratory grade	M0011	500 g	$ 9.45
flake	M0126	2 kg	33.50

★ **HAZARD ALERT:** Slightly toxic by ingestion. LD_{50} 2800 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; substance deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White to slightly green
Odor: None
CAS No. 7791-18-6
Technical Note: Readily loses H_2O, HCl, and/or Cl_2 upon strong heating.



Magnesium Chloride, Gramolpak

0.25 Molar
(as $MgCl_2 \cdot 6H_2O$) *M0175 pkg. $5.45

For hazard alert, storage, disposal, etc., see Magnesium Chloride, M0146.
*Gramolpak® is a unique package which makes 500 mL with distilled water.





Magnesium Chloride Solution

(as $MgCl_2 \cdot 6H_2O$)

1.0 Molar	M0164	500 mL	$11.85
0.1 Molar	M0121	500 mL	6.25

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Magnesium Hydroxide

laboratory grade, powder
$Mg(OH)_2$
F.W. 58.34

M0113	100 g	$ 7.10
M0089	500 g	13.00

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Dilute acids; solutions of ammonium salts; very slightly in water and alcohol.
Color: Gray/white
Odor: None
CAS No. 1309-42-8



Magnesium Hydroxide Solution

saturated suspension of $Mg(OH)_2$ in water

M0122 500 mL $10.70

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Poor unless kept tightly closed; absorbs CO_2 from air.
Color: Milky white
Odor: None
Technical Note: This suspension contains approx. 300 g/L.



Magnesium Nitrate

crystal
$Mg(NO_3)_2 \cdot 6H_2O$
F.W. 256.43

Reagent	M0114	100 g	$ 7.21
	M0012	500 g	13.41
Laboratory grade	M0204	500 g	$10.41

★ **HAZARD ALERT:** Strong oxidant; fire and explosion risk in contact with organic material. Skin, eye and respiratory tract irritant. LD_{50} 5440 mg/kg.
Storage: Inorganic #3
Disposal: #26a
Shelf Life: Fair to poor; substance deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 13446-18-9



Magnesium Nitrate, Gramolpak

0.1 Molar
(as $Mg(NO_3)_2 \cdot 6H_2O$) *M0176 pkg. $5.65

For hazard alert, storage, disposal, etc., see Magnesium Nitrate, M0114.
*Gramolpak® is a unique package which makes 1 liter with distilled water.



Magnesium Nitrate Solution

0.1 Molar
(as $Mg(NO_3)_2 \cdot 6H_2O$) M0123 500 mL $5.80

★ **HAZARD ALERT:** Skin and eye irritant.
Storage: Inorganic #3
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Magnesium Oxide

laboratory grade, powder
MgO
F.W. 40.32

M0013	100 g	$ 7.20
M0014	500 g	13.85

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Fair to poor; substance absorbs CO_2 and water from the air; store in a Flinn *Chem-Saf*® Bag.

Continued on next column.

MAGNESIUM OXIDE *continued*

Soluble: Slightly in water; soluble in acids and ammonium salt solutions.
Color: Off-white
Odor: None
CAS No. 1309-48-4



Magnesium Sulfate

epsom salts, heptahydrate
crystal
$MgSO_4 \cdot 7H_2O$
F.W. 246.50

Reagent	M0016	100 g	$ 5.15
	M0017	500 g	19.80
Laboratory grade	M0018	500 g	$ 5.30
	M0019	2 kg	12.50

★ **HAZARD ALERT:** Irritates eyes and respiratory tract.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; substance hygroscopic.
Soluble: Water and glycerin; slightly in alcohol.
Color: Colorless
Odor: None
CAS No. 10034-99-8



Magnesium Sulfate

anhydrous
laboratory grade, powder
$MgSO_4$
F.W. 120.39

M0115	100 g	$16.00
M0020	500 g	29.95

For hazard alert, storage, disposal, etc., see Magnesium Sulfate, M0016.
Color: White
Odor: None
CAS No. 7487-88-9



Magnesium Sulfate, Gramolpak

0.25 Molar
(as $MgSO_4 \cdot 7H_2O$) *M0177 pkg. $4.50

For hazard alert, storage, disposal, etc., see Magnesium Sulfate, M0016.
*Gramolpak® is a unique package which makes 500 mL with distilled water.



Magnesium Sulfate Solution

(as $MgSO_4 \cdot 7H_2O$)

0.5 Molar	M0167	500 mL	$9.30
0.1 Molar	M0124	500 mL	4.65

★ **HAZARD ALERT:** Eye irritant.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Magneson

see 4-(p-Nitrophenylazo) resorcinol

Where Do You Store Chemicals?

Everyone knows that laboratory chemicals need to be stored in a locked chemical storeroom. But what about those chemicals you are going to use tomorrow or next week? Recently, a 500-g bottle of potassium nitrate was removed from a laboratory fume hood between classes. Luckily, no one was hurt and the perpetrator was caught. What if the thief had done something stupid and hurt someone? Keep all chemicals locked up.

Malachite Green Oxalate

basic green 4
biological stain/indicator
pH 0.0 yellow to 2.0 green and
11.6 blue-green to 14.0 colorless

M0129	10 g	$12.05

★ **HAZARD ALERT:** Moderately toxic by ingestion. LD_{50} 275 mg/kg.

Storage: Organic #9
Disposal: #5
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Deep metallic green
Odor: None
CAS No. 2437-29-8
C.I. #42000

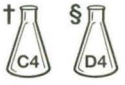


Malachite Green Solution

Saturated, alcoholic†	*M0147	20 mL	$ 6.95
	M0098	100 mL	12.80
1%, aqueous §	*M0148	20 mL	$ 5.35
	M0100	100 mL	11.60

★ **HAZARD ALERT:** Alcoholic solution is a flammable liquid; store in a dedicated flammables cabinet; if a flammables cabinet is not available, store in a Flinn *Saf-Stor*® Can. Alcoholic solution is toxic by ingestion.

Storage: Organic #9
Disposal: #18b
Shelf Life: Good if stored safely.
Color: Deep green
Odor: None



*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.



Maleic Acid

butenedioic acid
fine crystal
$HO_2CCH{:}CH\ CO_2H$
F.W. 116.07

M0090	200 g	$15.80

★ **HAZARD ALERT:** Moderately toxic by ingestion; severe body tissue irritant. LD_{50} 708 mg/kg.

Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Water, alcohol and acetone.
Color: White
Odor: Faint tea
CAS No. 110-16-7



Hood Storage of Chemicals

Reasons NOT to use a hood for chemical storage:

a. Hoods do not provide a secure storage space.
b. Labels may be damaged beyond recognition due to constant exposure to a corrosive environment.
c. The presence of hazardous materials stored under a hood would seriously complicate a hood fire.
d. Storing chemicals in the hood reduces available work space.
e. Many fume motor/blower sets are not designed for continuous, 24-hour operation.

Malonic Acid

propanedioic acid
crystal
$HO_2CCH_2CO_2H$
F.W. 104.06

M0091	25 g	$8.60
	(Packaged in PVC-coated bottles)	

★ **HAZARD ALERT:** Strong irritant; slightly toxic; when dissolved in water it is a strong acid; corrosive to eyes, skin and respiratory tract. Malonic acid has been used as a drug intermediate (precursor). This substance is regulated in some states like California. Check local regulations before purchasing. LD_{50} 1310 mg/kg.

Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: White
Odor: Faint beef boullion
CAS No. 141-82-2



Maltose

malt sugar
laboratory grade, powder
$C_{12}H_{22}O_{11}•H_2O$
F.W. 360.32

M0116	100 g	$ 7.40
M0021	500 g	13.80

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Buff
Odor: Fresh cut hay
CAS No. 6363-53-7



Manganese

carbon free
chips
Mn
A.W. 54.94

M0130	100 g	$ 7.95
M0022	500 g	11.55

★ **HAZARD ALERT:** Irritant as a fume or dust; dust is flammable. TLV 0.2 mg/m^3 as dust.

Storage: Inorganic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Decomposes water; soluble in dilute acids.
Color: Gray/blue
Odor: None
CAS No. 7439-96-5



Manganese Chloride

see Manganous Chloride

Manganese Dioxide

manganese(IV) oxide
powder
MnO_2
F.W. 86.94

Reagent	M0023	100 g	$ 9.10
	M0024	500 g	23.95
Laboratory grade	M0205	100 g	$ 6.50
	M0025	500 g	6.95
	M0026	2 kg	23.45

★ **HAZARD ALERT:** Strong oxidant; avoid contact with organic material; body tissue irritant.

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite if stored safely.
Soluble: Hydrochloric acid; insoluble in water.
Color: Gray
Odor: None
CAS No. 1313-13-9



Manganous Chloride

manganese(II) chloride
reagent grade, crystal
$MnCl_2 \cdot 4H_2O$
F.W. 197.91

M0027	100 g	**$ 9.25**
M0028	500 g	**29.00**

★ **HAZARD ALERT:** Slightly toxic by ingestion. LD_{50} 1484 mg/kg.
Storage: Inorganic #2
Disposal: #27f
Shelf Life: Fair to poor; substance deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: Pink
Odor: None
CAS No. 13446-34-9



Manganous Chloride, Gramolpak

0.25 Molar
(as $MnCl_2 \cdot 4H_2O$) ***M0178** pkg. **$5.25**

For storage, disposal, etc., see Manganous Chloride, M0027.
*Gramolpak® is a unique package which makes 500 mL with distilled water.





Manganous Chloride Solution

0.5 Molar
(as $MnCl_2 \cdot 4H_2O$) **M0168** 500 mL **$9.55**

Storage: Inorganic #2
Disposal: #27f
Shelf Life: Indefinite
Color: Pink
Odor: None



Manganous Nitrate Solution

manganese(II) nitrate
50%, aqueous
$Mn(NO_3)_2$
F.W. 178.94

M0117	100 mL	**$ 7.95**
M0029	500 mL	**16.60**

★ **HAZARD ALERT:** Slightly toxic by ingestion; corrosive to body tissues.
Storage: Inorganic #3
Disposal: #27f
Shelf Life: Indefinite
Color: Pink
Odor: Faint nitric acid
CAS No. 20694-39-7
Technical Note: Manganous nitrate solution has a density of 1.92 g/mL and is 5.4 M.



Manganous Peroxide

see Manganese Dioxide

Manganous Sulfate

manganese(II) sulfate
powder
$MnSO_4 \cdot H_2O$
F.W. 169.01

Reagent	**M0030**	100 g	**$ 9.45**
	M0031	500 g	**22.20**
Laboratory grade	**M0206**	500 g	**$18.90**

★ **HAZARD ALERT:** Body tissue irritant.
Storage: Inorganic #2
Disposal: #27f
Shelf Life: Poor; substance hygroscopic.
Soluble: Water; not alcohol.
Color: Rose
Odor: None
CAS No. 10034-96-5



Manganous Sulfate, Gramolpak

0.25 Molar
(as $MnSO_4 \cdot H_2O$) ***M0179** pkg. **$5.30**

For hazard alert, storage, disposal, etc., see Manganous Sulfate, M0030.
*Gramolpak® is a unique package which makes 500 mL with distilled water.





Manganous Sulfate Solution

(as $MnSO_4 \cdot H_2O$)

0.2 Molar	**M0169**	500 mL	**$6.75**
0.1 Molar	**M0149**	500 mL	**5.00**

Storage: Inorganic #2
Disposal: #27f
Shelf Life: Indefinite
Color: Colorless
Odor: None



Flinn Gramolpaks® make solution preparation easy.

Marble Chips

limestone, calcium carbonate
for CO_2 generation

M0032	500 g	**$3.90**
M0033	2 kg	**8.25**

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: In acids with evolution of CO_2; slightly in water.
Color: Gray/white
Odor: None
CAS No. 471-34-1



Marvel Mystery Oil

see page 451

Melibiose

carbohydrate, disaccharide
laboratory grade, powder
$C_{12}H_{22}O_{11} \cdot H_2O$
F.W. 360.32

M0210 2.5 g **$19.85**

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: White
Odor: None
CAS No. 5340-95-4



Dialing for Help

Post emergency telephone numbers next to the laboratory telephone. Also post any special operating instructions needed to get an outside line (e.g., dial 9 first). Make sure all students know how to dial for help.

Menthol

laboratory grade, crystal
$C_{10}H_{20}O$
F.W. 156.26

M0103	25 g	**$11.95**
M0104	100 g	**31.95**

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Slightly toxic by ingestion and inhalation; body tissue irritant; severe eye irritant. LD_{50} 3180 mg/kg.

Storage: Organic #2
Disposal: #18b
Shelf Life: Indefinite
Soluble: Alcohol, many organic solvents, acetic acid.
Color: White/clear
Odor: Peppermint
CAS No. 89-78-1



Mercuric and Mercury(II) Chloride

Mercury compounds in which the mercury has an ionic charge or oxidation number of two.

Mercuric Chloride

mercury(II) chloride
reagent grade, granular
$HgCl_2$
F.W. 271.50

M0036	25 g	**$ 8.85**
M0037	100 g	**25.93**

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** *Highly toxic* by ingestion, inhalation and skin absorption. *May be fatal!* Use all precautions in handling this substance. LD_{50} 1 mg/kg.

Storage: Inorganic #2; store in a Flinn *Chem-Saf*® Bag. Store in a locked poisons cabinet.
Disposal: #27f
Shelf Life: Good if stored safely. Do not store this severe poison in a naked glass bottle.
Soluble: Water, alcohol, glycerin and acetic acid.
Color: White
Odor: None
CAS No. 7487-94-7



Mercuric Chloride, Gramolpak

0.25 Molar
(as $HgCl_2$) *M0180 pkg. **$8.50**

For hazard alert, storage, disposal, etc., see Mercuric Chloride, M0036.

*Gramolpak® is a unique package which makes 100 mL with distilled water.





Mercuric Chloride Solution

0.1 Molar
(as $HgCl_2$) **M0150** 500 mL **$9.95**
(Packaged in PVC-coated bottles)

For hazard alert, storage, disposal, etc., see Mercuric Chloride, M0036.
Color: Colorless
Odor: None



Demonstration of Water-Reactive Metals

Look at our listings of substances like sodium and potassium. Where else can you buy tiny pieces of these metals so you can demonstrate these materials but be left with no storage problem after the fact? Some suppliers ship you enormous quantities of these substances and let you struggle with the storage problems. Before you buy a water-reactive metal, review all of our listings. Remember: Flinn solves problems rather than creating them.

Mercuric Iodide

mercury(II) iodide, red
reagent grade, powder
HgI_2
F.W. 454.43

M0132	10 g	**$ 9.45**
M0039	25 g	**21.15**

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** *Highly toxic* by ingestion, inhalation and skin absorption. *May be fatal!* Use all precautions in handling this substance. LD_{50} 40 mg/kg.

Storage: Inorganic #2; store in a Flinn *Chem-Saf*® Bag. Store in a locked poisons cabinet.
Disposal: #27f
Shelf Life: Good if stored safely. Do not store this severe poison in a naked glass bottle. Substance is light sensitive.
Soluble: Almost insoluble in water; soluble in boiling alcohol; solutions of sodium thiosulfate or potassium iodide or other hot alkali chloride solutions.
Color: Red
Odor: None
CAS No. 7774-29-0



Mercuric Nitrate

mercury(II) nitrate
reagent grade, crystal
$Hg(NO_3)_2 \bullet H_2O$
F.W. 342.63

M0152	10 g	**$ 8.35**
M0041	25 g	**20.20**
M0042	100 g	**42.93**

(All above package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** *Highly toxic* by ingestion, inhalation and skin absorption. *May be fatal.* Use all precautions in handling this substance. Fire risk in contact with organic materials. Strong oxidizer. LD_{50} 26 mg/kg.

Storage: Inorganic #3; store in a Flinn *Chem-Saf*® Bag. Store in a locked poisons cabinet.
Disposal: #27f
Shelf Life: Poor; substance deliquescent; keep container tightly closed.
Soluble: Water and nitric acid; insoluble in alcohol.
Color: White
Odor: Faint nitric acid
CAS No. 7783-34-8



Mercuric Nitrate, Gramolpak

0.02 Molar
(as $Hg(NO_3)_2 \bullet H_2O$) *M0181 pkg. **$6.10**

For hazard alert, storage, disposal, etc., see Mercuric Nitrate, M0152.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Mercuric Nitrate Solution

0.1 Molar
(as $Hg(NO_3)_2 \bullet H_2O$) **M0125** 500 mL **$14.85**
(Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Toxic by ingestion and skin absorption. Practice strict hygiene. Corrosive; contains nitric acid.

Storage: Inorganic #3
Disposal: #27f
Shelf Life: Good
Color: Colorless
Odor: None



Mercuric Oxide

mercury(II) oxide, red
reagent grade, powder
HgO
F.W. 216.61

M0043	25 g	**$ 8.60**
M0044	100 g	**19.13**
M0045	500 g	**75.93**

(All above package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Highly toxic; skin irritant; avoid contact with organic material. LD_{50} 18 mg/kg.

MERCURIC OXIDE continued on next page.

MERCURIC OXIDE *continued*

Storage: Inorganic #4 in a Flinn *Chem-Saf*® Bag. Store in a locked poisons cabinet.
Disposal: #27d
Shelf Life: Good if properly stored; decomposes on exposure to light. Do not store this severe poison in a naked glass bottle. Substance is light sensitive.
Soluble: Dilute hydrochloric and nitric acid; insoluble in water and alcohol.
Color: Orange/red
Odor: None
CAS No. 21908-53-2



Mercuric Oxide

mercury(II) oxide, yellow
reagent grade, powder
HgO
F.W. 216.61

M0153	10 g	**$10.25**
M0069	25 g	**22.30**

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Highly toxic; skin irritant; avoid contact with organic material. LD_{50} 18 mg/kg.
Storage: Inorganic #4 in a Flinn *Chem-Saf*® Bag. Store in a locked poisons cabinet.
Disposal: #27d
Shelf Life: Good if properly stored; decomposes on exposure to light. Do not store this severe poison in a naked glass bottle. Substance is light sensitive.
Soluble: Dilute hydrochloric and nitric acid; insoluble in water and alcohol.
Color: Orange/yellow
Odor: None
CAS No. 21908-53-3



Mercuric Sulfate

mercury(II) sulfate
laboratory grade, powder
$HgSO_4$
F.W. 296.68

M0133	10 g	**$16.95**

(Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Highly toxic; skin, eye, respiratory irritant. LD_{50} 57 mg/kg.
Storage: Inorganic #2 in a Flinn *Chem-Saf*® Bag. Store in a locked poisons cabinet.
Disposal: #27f
Shelf Life: Good if stored properly; decomposes on exposure to light and heat. Do not store this severe poison in a naked glass bottle. Substance is light sensitive.
Soluble: Acids; decomposes in water; insoluble in alcohol.
Color: White
Odor: Faint nitric acid
CAS No. 7783-35-9



Mercurous and Mercury(I) Chloride

Mercury compounds in which the mercury has an ionic charge or oxidation number of one.

Mercurous Chloride

mercury(I) chloride, calomel
laboratory grade, powder
Hg_2Cl_2
F.W. 472.14

M0134	10 g	**$ 8.55**
M0048	25 g	**16.75**

★ **HAZARD ALERT:** Highly toxic; skin, eye, and respiratory irritant. LD_{50} 166 mg/kg.
Storage: Inorganic #2 in a Flinn *Chem-Saf*® Bag. Store in a locked poisons cabinet.
Disposal: #27f
Shelf Life: Good; darkens on exposure to light. Do not store this poison in a naked glass bottle.

Continued on next column.

MERCUROUS CHLORIDE *continued*

Soluble: Insoluble in water, alcohol, ether and cold dilute acids.
Color: White
Odor: None
CAS No. 10112-91-1



Mercurous Nitrate

mercury(I) nitrate
reagent grade, crystal
$Hg_2(NO_3)_2 \cdot 2H_2O$
F.W. 561.22

M0135	10 g	**$ 7.45**
M0049	25 g	**13.85**
M0050	100 g	**39.63**

★ **HAZARD ALERT:** Highly toxic; skin, eye, and respiratory irritant; possible sensitizer; strong oxidizer. LD_{50} 170 mg/kg.
Storage: Inorganic #3 in a Flinn *Chem-Saf*® Bag. Store in a locked poisons cabinet.
Disposal: #27f
Shelf Life: Anhydrous in dry air; sensitive to light; otherwise good. Do not store this poison in a naked glass bottle.
Soluble: Nitric acid
Color: White
Odor: Faint nitric acid
CAS No. 7782-86-7



Mercurous Nitrate, Gramolpak

0.1 Molar
(as $Hg_2(NO_3)_2 \cdot 2H_2O$) ***M0182** pkg. **$20.10**

For hazard alert, storage, disposal, etc., see Mercurous Nitrate, M0135.
* Dissolve Gramolpak® in 100 mL of concentrated nitric acid (Flinn No. N0043); dilute to 1 liter with distilled water. Always add acid to water.





Mercurous Sulfate

mercury(I) sulfate
laboratory grade
Hg_2SO_4
F.W. 497.24

M0183	10 g	**$28.35**

(Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Highly toxic; skin, eye, and respiratory irritant. LD_{50} 152 mg/kg. TLV 0.1 mg/m^3.
Storage: Inorganic #2 in a Flinn *Chem-Saf*® Bag. Store in a locked poisons cabinet.
Disposal: #27f
Shelf Life: Indefinite
Soluble: Hot sulfuric acid; dilute nitric acid; slightly in water.
Color: White to yellow
Odor: None
CAS No. 7783-36-0



Toxicity of Mercury Compounds

Mercury(II) compounds are generally more toxic than mercury(I) compounds. Prolonged exposure to even low concentrations of any of these substances should be avoided.

Compatible Chemical Families

Storing chemicals in alphabetical order can result in incompatible neighbors. For example: barium peroxide and benzaldehyde react violently together and should not be stored near each other. Chemicals should be stored in compatible chemical families. See pages 965–969 for details on the Flinn Suggested Chemical Storage Pattern.

Mercury

metal
reagent grade, 99.99%
Hg
A.W. 200.59

M0154	50 g	$ 8.25
M0051	100 g	11.35
M0052	454 g	29.41

★ **HAZARD ALERT:** Metallic mercury is *highly toxic* by skin absorption and by inhalation of vapor. Metallic mercury has a relatively low vapor pressure and vaporizes readily when heated. Continuous exposure to small concentrations of vapor is harmful. Frequent skin contact is harmful. Dispense and use mercury only under a hood or in a well-ventilated area. Dispense mercury in a plastic or glass tray so that any spillage can easily be recovered. ***WARNING:*** Students should not be permitted to amalgamate coins or jewelry with mercury. TLV 0.025 mg/m^3 as vapor.

Storage: Inorganic #1. If the mercury is stored in a glass container, enclose that container in a Flinn *Chem-Saf*® Bag. A plastic bottle should be enclosed in a Flinn *Chem-Saf*® Bag as well since mercury easily escapes from the container. *Never* store mercury in an open container. Securely close any bottle cap. If storage is necessary in an open vessel, cover the mercury with a shallow layer of water.

Disposal: You cannot dispose of mercury. See Disposal Method #27b or contact Flinn Scientific, Inc. or Mercury Waste Solutions (1-800-741-3343) for advice on mercury disposal.

Shelf Life: Good if stored properly.

Soluble: Sulfuric acid upon boiling; readily in nitric acid; insoluble in hydrochloric acid, water, alcohol and ether.

Color: Silver

Odor: None

CAS No. 7439-97-6



Mercury Compounds

see Mercuric (Mercury II) and Mercurous (Mercury I) compounds listed alphabetically

Metal Electrode Set

contains six 6″ × ½″ strips
one each of aluminum, brass,
copper, iron, lead and zinc metals

AP4602	pkg.	$6.50

Storage: Inorganic #1

Disposal: #26a

Shelf Life: Excellent



Methanol

see Methyl Alcohol

DL-Methionine

amino acid
powder
$C_5H_{11}NO_2S$
F.W. 149.22

M0106	200 g	$25.75

Storage: Organic #1

Disposal: #26a

Shelf Life: Indefinite

Soluble: Water, alkalies and dilute acids; insoluble in alcohol.

Color: White

Odor: Like odorized natural gas.

CAS No. 59-51-8



Mercury Under Control

If you handle mercury, always do so over a shallow, nonporous plastic or glass tray. If even a small spill occurs it will be captured in the tray. Now, with the mercury in the tray, it is easy to collect the droplets and return them to the storage container. Mercury is most dangerous to you in its most finely divided form, as when you spill it and it splashes onto the bench or the floor.

Methyl Alcohol

methanol, absolute (anhydrous)
CH_3OH
F.W. 32.04

Reagent	M0054	500 mL	$ 4.55
	M0055	4 liters	17.61
	M0056	20 liters	60.51
Laboratory grade	M0207	4 liters	$16.21
	M0208	20 liters	55.01

★ **HAZARD ALERT:** Flammable; dangerous fire risk; toxic by ingestion (ingestion may cause blindness). TLV 262 mg/m^3. LD_{50} 5628 mg/kg.

Storage: Organic #2 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.

Disposal: #18a

Shelf Life: Good if stored safely.

Soluble: Miscible with water and alcohol.

Color: Colorless

Odor: Alcohol

CAS No. 67-56-1



Safety Purchase Suggestion: Please consider the use of anhydrous ethyl alcohol (E0012, etc.) as a substitute. Ethyl alcohol is a good substitute for methyl alcohol for most laboratory experiments and as a burner fuel. Avoid purchasing 20-liter cans of this substance unless you have approved, dedicated flammables storage.

Methyl t-Butyl Ether

MTBE
laboratory grade
$CH_3OC(CH_3)_3$
F.W. 88.15

M0201	100 mL	$ 9.31
M0202	500 mL	17.51

★ **HAZARD ALERT:** Flammable liquid; slightly toxic. LD_{50} 3865 mg/kg.

Storage: Organic #4 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.

Disposal: #15

Shelf Life: Indefinite

Soluble: Slightly soluble in water, soluble in any organic solvent.

Color: Colorless

Odor: Sweet

CAS No. 1634-04-4



3-Methyl-1-Butanol

see Isopentyl Alcohol

Methyl Cellulose

laboratory grade, powder

M0057	100 g	$ 8.65
M0058	500 g	35.50

Storage: Organic #2

Disposal: #26a

Shelf Life: Good if kept dry.

Soluble: Insoluble in common organic solvents; soluble in water warmer than 50.5 °C. An aqueous solution is best prepared by dispensing the substance in hot (but not boiling) water while stirring—chill to 5 °C.

Color: White

Odor: None

CAS No. 9004-67-5



Methyl Cellulose Solution

3%, aqueous, quieting solution

M0155	20 mL	$4.90
M0171	100 mL	6.25

Storage: Organic #2

Disposal: #26b

Shelf Life: Indefinite

Color: Cloudy/colorless

Odor: None



SAFETY TIP

Suggestions for Cleaning Up Mercury Spills

1. Immediately upon spillage or thermometer breakage, open the windows, doors or, in general, provide maximum ventilation. Air dilution is the solution for your personal protection when mercury is involved.
2. Never sweep the spill with a broom. Attempt, to the greatest extent possible, to avoid creating free mercury vapor. Avoid contaminating brooms, your shoes or other items in the area. Put plastic bags over your shoes if you must walk in the spill area.
3. Push the pools of mercury together.
4. Pick up the pools with a closed device like a medicine dropper or a dropping pipet with a closed rubber bulb on one end. Transfer the droplets to a seamless polyethylene or polypropylene bottle.
5. Mercury droplets, surprisingly, will cling to vertical surfaces and sometimes on the underside of bench tops, shelves, etc. These hidden droplets are often overlooked.
6. Now that the visible droplets have been found, picked up and placed in a seamless plastic bottle—how do you handle the remaining residue?

   It is unlikely that you can pick up all the hidden droplets. There are some steps you can take while maintaining a high level of room ventilation.

   A commonly practiced method utilizes sulfur powder as a treatment for mercury spills. Tests have shown that sulfur has little or no value in creating mercury sulfide. Mercury sulfide would certainly be a safer form than mercury metal but sulfur simply does not work.

   Zinc metal dust does react with elemental mercury to form a very safe amalgam. The amalgam formed is more easily collected and disposed of than elemental mercury. If the mercury is "dirty" with dust and dirt, the likelihood of the zinc amalgam being formed is reduced. The zinc metal powder may help with some of the "clean" droplets. Be careful in handling zinc metal dust. If it is damp and in a confined space (like a bottle or a can) the container will expand or even explode.

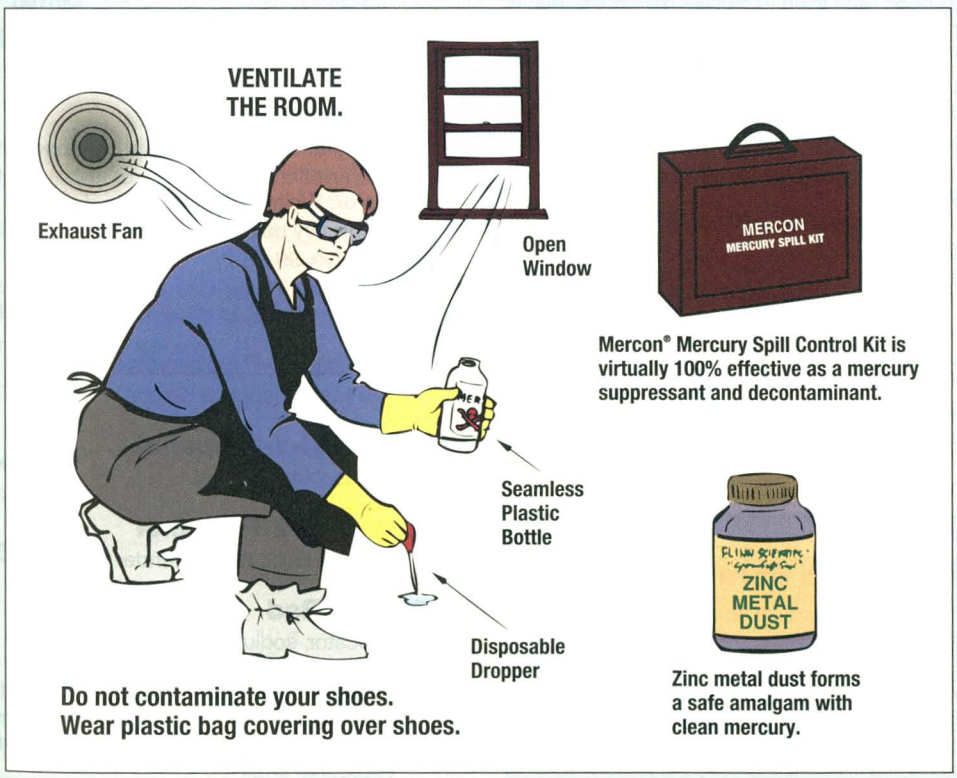
   The Mercon® Mercury Spill Control Kit is virtually 100% effective as a mercury suppressant and decontaminant. On contact with mercury, Mercon® immediately stops mercury vapor from going into the air.

   A mercury vacuum cleaner is available from Flinn on a rental basis. The evacuated air is drawn through a special filter to prevent mercury metal or vapor from re-entering the room. See index to locate details about renting a special mercury vacuum.

   NEVER USE A STANDARD VACUUM CLEANER. You would simply create a very dangerous mercury aerosol which would be spewed into the area where the vacuum is operated. You would create the very problem you are attempting to avoid, i.e., free mercury vapor.
7. Broken mercury thermometers in an oven can flood the lab with free and dangerous mercury vapor. If a mercury thermometer is broken in a heating device, immediately open all windows and provide maximum air ventilation. Even if no mercury is visible in the appliance, it should be transported to a hood or out of doors and operated at full temperature to drive off any residual mercury.

   Mercury droplets or vapor can have a devastating effect on electronic equipment like electronic balances or microcomputers.

   You might consider eliminating mercury thermometers from most laboratory use. We agree—organic-filled (usually hexane) thermometers are not as accurate as mercury thermometers. However, for most applications, the organic-filled thermometers will do the job. For those few critical and specific applications, you may still wish to use mercury thermometers. Digital thermometers are also a safer alternative. The fewer mercury thermometers used, the less the likelihood for breakage and mercury contamination.



Methyl Ethyl Ketone

2-butanone
laboratory grade
$CH_3COC_2H_5$ **M0060** 500 mL **$8.50**
F.W. 72.11

★ **HAZARD ALERT:** Flammable, dangerous fire risk; narcotic by inhalation. LD_{50} 2737 mg/kg. TLV 590 mg/m³.

Storage: Organic #4 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Good if stored safely.
Soluble: Alcohol and ether
Color: Colorless
Odor: Nail polish remover
CAS No. 78-93-3



Methyl Green Staining Solution

1%, aqueous

*M0138	20 mL	$ 7.80
M0093	100 mL	17.55

Storage: Organic #9
Disposal: #26b
Shelf Life: Good if stored safely.
Color: Blue/green
Odor: None



*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Methyl Isobutyl Ketone

4-methyl-2-pentanone
laboratory grade
$(CH_3)_2CHCH_2COCH_3$ **M0156** 250 mL **$12.40**
F.W. 100.09

★ **HAZARD ALERT:** Flammable liquid, dangerous fire risk; may form explosive peroxides, do not distill to dryness; avoid breathing vapor; avoid skin contact. LD_{50} 2080 mg/kg. TLV 205 mg/m³.

Storage: Organic #4; store in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Fair to poor. May form explosive peroxides. Avoid prolonged storage.
Soluble: Slightly in water; miscible with most organic solvents.
Color: Colorless
Odor: Sweet, ether-like
CAS No. 108-10-1



Methyl Methacrylate

monomer
laboratory grade
$CH_2=C(CH_3)CO_2CH_3$ **M0118** 100 mL **$13.71**
F.W. 100.12 **M0062** 500 mL **23.61**

★ **HAZARD ALERT:** Flammable liquid; fire risk; severe body tissue irritant; possible sensitizer. LD_{50} 7872 mg/kg. TLV 410 mg/m³.

Storage: Organic #3 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.

Continued on next column.

Bottle Cap Safety

Frequently a bottle cap (closure) is specific to a particular product. You would be wise not to interchange chemical bottle caps. Some caps, like those used on acids, are color coded. Can you imagine the potential hazard created by switching a red nitric acid cap to a bottle of hydrochloric acid? A user may assume the cap color signifies the bottle contents. Disaster could result!

METHYL METHACRYLATE *continued*

Disposal: #18a
Shelf Life: Indefinite
Soluble: Most organic solvents; slightly in water.
Color: Colorless
Odor: Strong banana oil
CAS No. 80-62-6



Methyl Orange

dye/indicator
pH 3.0 red to 4.4 yellow
$C_{14}H_{15}N_3O_3SNa$ **M0076** 25 g **$9.80**
F.W. 328.33

★ **HAZARD ALERT:** Highly toxic by ingestion. LD_{50} 60 mg/kg.

Storage: Organic #9. Store in a locked poisons cabinet.
Disposal: #26a
Shelf Life: Indefinite
Soluble: Best in hot water; partially in alcohol.
Color: Brown/orange
Odor: Laundry soap
CAS No. 547-58-0
C.I. #13025



Methyl Orange Indicator Solution

0.1%, aqueous

*M0157	20 mL	$4.35
M0078	500 mL	6.50

★ **HAZARD ALERT:** Toxic by ingestion.

Storage: Organic #9
Disposal: #26b
Shelf Life: Fair
Color: Red/orange
Odor: None



*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Methyl Paraben

methyl p-hydroxybenzoate
mold inhibitor
$C_8H_8O_3$ **M0190** 100 g **$23.20**
F.W. 152.16

Storage: Organic #3
Disposal: #18b
Shelf Life: Indefinite
Soluble: Soluble in alcohol, acetone, and ether. Slightly soluble in water.
Color: White
Odor: Dry paint
CAS No. 99-76-3



Technical Note: Use a 30% solution of methyl paraben in methyl alcohol as an effective mold inhibitor.

4-Methyl-2-Pentanone

see Methyl Isobutyl Ketone

2-Methyl-1-Propanol

see Isobutyl Alcohol

2-Methyl-2-Propanol

see tert-Butyl Alcohol under Butyl

Methyl Red

indicator, sodium salt
pH 4.4 red to 6.2 yellow
$C_{15}H_{14}N_3O_2Na$ **M0158** 5 g **$8.25**
F.W. 291.28 **M0081** 10 g **9.55**

Storage: Organic #9
Disposal: #26a

METHYL RED continued on next page.

METHYL RED *continued*

Shelf Life: Indefinite
Soluble: Alcohol, ether, water and acetic acid. Color of solution fades quickly because of reduction.
Color: Brown/orange
Odor: None
CAS No. 845-10-3

D3

Methyl Red Indicator Solution

0.02%, aqueous

*M0159	20 mL	$ 4.45
M0085	100 mL	6.45
M0086	500 mL	14.90

Storage: Organic #9
Disposal: #26b
Shelf Life: Fair to poor (color fades because of reduction).
Color: Red
Odor: None

C3

*A special and unique dropping bottle package called a Flinn *E-Z Drop*®.

E-Z Drop® Bottle

Flinn's *E-Z Drop*® bottles are great for storing and dispensing indicator solutions.

Flinn always provides safe and easy-to-use packaging.



5-Methyl Resorcinol

see Orcinol

Methyl Salicylate

oil of wintergreen, synthetic
laboratory grade
$C_8H_8O_3$ F.W. 152.15

M0119	100 mL	$11.00
M0063	500 mL	21.85

★ **HAZARD ALERT:** Moderately toxic by ingestion; severe body tissue irritant. LD_{50} 887 mg/kg.
Storage: Organic #3 in a Flinn *Chem-Saf*® Bag.
Disposal: #18b
Shelf Life: Indefinite if stored safely.
Soluble: Slightly in water, alcohol, acetic acid and ether.
Color: Colorless or pale yellow/pale pink
Odor: Wintergreen
CAS No. 119-36-8

C4

Methyl Sulfoxide

see Dimethyl Sulfoxide

Methyl Violet 2B

indicator grade
pH 0.1 yellow to 2.7 violet
$C_{24}H_{28}ClN_3$ F.W. 393.94

M0160	10 g	$ 8.80
M0083	25 g	13.85

★ **HAZARD ALERT:** Moderately toxic by ingestion; body tissue irritant. LD_{50} 413 mg/kg.
Storage: Organic #9
Disposal: #26a

Continued on next column.

METHYL VIOLET 2B *continued*

Shelf Life: Indefinite
Soluble: Water, chloroform; partially in alcohol and glycerin.
Color: Metallic green
Odor: None
CAS No. 8004-87-3

C4

Methyl Violet 2B Solution

saturated, alcoholic

M0107	100 mL	$17.30

★ **HAZARD ALERT:** Flammable liquid; toxic.
Storage: Organic #9 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Indefinite
Color: Blue/violet
Odor: Alcohol

C3

Methyl Violet Aqueous Solution

staining solution, 1% aqueous

*M0141	20 mL	$4.60

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Blue/purple
Odor: None

D4

*A special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Methylene Blue

biological stain
$C_{16}H_{18}ClN_3S \bullet 3H_2O$ F.W. 373.90

M0072	25 g	$13.40
M0073	100 g	31.70

★ **HAZARD ALERT:** Slightly toxic. LD_{50} 1180 mg/kg.
Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water, alcohol and chloroform.
Color: Gray/green
Odor: None
CAS No. 7220-79-3
C.I. #52015

C3

Methylene Blue Solution

1%, aqueous

M0074	100 mL	$4.60
M0075	500 mL	9.00

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Deep blue
Odor: None

D3

Chemicals in Refrigerators

We commonly find flammables (like ether) and 30% hydrogen peroxide in school science department refrigerators. Found along with these items are lunches, apples, and open cans of soda pop. Unless your school refrigerator is designed specifically for the storage of flammables, keep chemicals out of the refrigerator. Remember that sparking bimetallic switches activate both the refrigerator's compressor and internal light.

Methylene Blue Solution

Loeffler's bacterial stain
contains: methylene blue, potassium hydroxide, ethyl alcohol and water

M0161	100 mL	**$ 6.10**
M0095	500 mL	**12.55**

★ **HAZARD ALERT:** Contains ethyl alcohol; toxic by ingestion and inhalation; body tissue irritant.

Storage: Organic #9 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #10
Shelf Life: Indefinite
Color: Blue
Odor: Slight alcohol



Methylene Chloride

dichloromethane
laboratory grade
CH_2Cl_2
F.W. 84.94

M0162	100 mL	**$6.33**
M0059	500 mL	**7.33**

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Can be narcotic in high concentrations. Slightly toxic; *possible carcinogen*. LD_{50} 1600 mg/kg. TLV 25 ppm.
Storage: Organic #4
Disposal: #27j
Shelf Life: Volatile liquid; keep tightly capped.
Soluble: Alcohol; slightly in water.
Color: Colorless
Odor: Ethyl ether-like
CAS No. 75-09-2



Milk of Magnesia

see Magnesium Hydroxide Solution

Millon's Reagent Solution

protein determination

M0087	100 mL	**$12.45**

(Packaged in PVC-coated bottle)

★ **HAZARD ALERT:** A solution of mercury(II) nitrate in concentrated nitric acid. The combination of toxic mercury(II) nitrate and a corrosive acid combined with the fact that the solution is frequently boiled makes its use *extremely hazardous.*
Storage: Inorganic #9 in a Flinn *Chem-Saf*® Bag in a dedicated acid cabinet. If one is not available, store in a Flinn *Saf-Cube*®.
Disposal: #27f
Shelf Life: Good if stored safely.
Color: Colorless
Odor: Slight nitric acid



Technical Note: Proteins containing tyrosine give a positive result with Millon's reagent. Consider replacing the Millon's test with the xanthoproteic test—reaction with nitric acid—which gives positive results with both tyrosine and tryptophan.

Transporting Chemicals from Place to Place

Avoid transporting naked bottles of hazardous chemicals from room to room without using an unbreakable secondary container. We realize you cannot afford an expensive bottle carrier, but how about a plastic bucket? Put on your conventional wisdom cap! Put bottles of dangerous materials into another durable and nonreactive secondary container before you transport.

Mineral Oil

light	**M0064**	500 mL	**$ 5.55**
laboratory grade	**M0065**	4 liters	**24.40**

Storage: Organic #3
Disposal: #18b
Shelf Life: Indefinite
Soluble: Many common organic solvents; insoluble in water and acids.
Color: Colorless
Odor: None
CAS No. 8020-83-5



Technical Note: Mineral oil is a safer alternative to halogenated solvents in halogen extraction experiments.

Mohr's Salt

see Ferrous Ammonium Sulfate

Molasses

pure, dark **M0068** 300 mL **$4.00**

Storage: With non-hazardous miscellaneous organic material.
Disposal: #26b
Shelf Life: Fair to poor
Soluble: Water, alcohol
Color: Dark brown
Odor: Brown sugar
Note: Not for human consumption.



Mold Inhibitor

see Propionic Acid or Methyl Parabon

Molecular Sieves

see Ion Exchange Resin

Molisch Reagent

contains: 1-naphthol and ethyl alcohol

M0174	100 mL	**$8.00**

(Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Flammable liquid. Store in a dedicated flammables cabinet. Toxic by ingestion and inhalation.
Storage: Organic #2
Disposal: #18b
Shelf Life: Fair; darkens with age.
Color: Clear to brown
Odor: Alcohol-like



Molybdenum (IV) Oxide

powder
MoO_2
F.W. 127.94

M0140 10 g **$16.10**

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Fair
Soluble: Slightly in hot, concentrated sulfuric acid; insoluble in water.
Color: Gray
Odor: None
CAS No. 18868-43-4



Molybdic Acid

see Ammonium Molybdate

Monosodium Glutamate

MSG
crystal
$COOH(CH_2)_2CH(NH_2)COONa$
F.W. 169.08

M0144 100 g **$4.85**

Storage: Organic #1
Disposal: #26a

MONOSODIUM GLUTAMATE continued on next page.

MONOSODIUM GLUTAMATE *continued*

Shelf Life: Fair to poor
Soluble: Water and alcohol
Color: White
Odor: Slight spice
CAS No. 142-47-2



Mounting Medium

CytoSeal

High viscosity	***M0193**	4 oz.	**$19.40**
Low viscosity	***M0194**	4 oz.	**19.20**

★ **HAZARD ALERT:** Contains toluene. Moderately toxic by ingestion and inhalation.
Storage: Organic #4
Disposal: #18b
Shelf Life: Indefinite
Soluble: Insoluble in water, soluble in toluene.
Color: None
Odor: Slight toluene



Technical Note: Both the low and high viscosity mounting media are acrylic resins and will not crack or discolor with age. They are quick-drying and soluble in toluene and xylenes. The low viscosity media is suggested for use with cover glass.
*Special package containing a twist-open dropper cap.

Mueller-Hinton Agar

bacteriological culture media

M0203	100 g	**$31.35**

Storage: With culture media.
Disposal: #26a
Shelf Life: Good, if kept dry.
Soluble: Water
Color: Tan or off-white
Odor: None



Murexide

ammonium purpurate
indicator for complex ion titrations
$C_8H_8N_6O_6$
F.W. 284.19

M0143	2 g	**$11.65**

Storage: Organic #2
Disposal: #18b
Shelf Life: Good
Soluble: Slightly in hot water; not alcohol.
Color: Purple
Odor: Slight nitric acid
CAS No. 3051-09-0



Muriatic Acid

see Hydrochloric Acid

N

Nails

see Iron, Nails

Naphthalene

flake	**N0065**	250 g	**$ 7.25**
$C_{10}H_8$	**N0001**	500 g	**8.20**
F.W. 128.17	**N0002**	2 kg	**24.45**

★ **HAZARD ALERT:** Moderately toxic by ingestion, inhalation and skin contact; moderate fire hazard. LD_{50} 490 mg/kg. TLV 52 mg/m^3.
Storage: Organic #3
Disposal: #18b
Shelf Life: Volatile flakes; keep tightly closed.

Continued on next column.

NAPHTHALENE *continued*

Soluble: Alcohol and ether; not water.
Color: Shiny white
Odor: Moth balls
CAS No. 91-20-3



Technical Note: When used to show states of matter by heating in a test tube, quantity should be small and heating gentle so that minimum vapor is generated. Use under a hood or in a well-ventilated room.
Safety Purchase Note: Safer alternative substances for melting point determination are cetyl alcohol, 1-octadecanol, palmitic acid, stearic acid, lauric acid, or 4-(t-octyl) phenol.

Naphthalene Acetic Acid

$C_{10}H_7CH_2COOH$
F.W. 186.2

N0066	10 g	**$24.20**
(Packaged in PVC-coated bottles)		

★ **HAZARD ALERT:** Moderately toxic; skin irritant.
Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Acetone, ether and chloroform; slightly in alcohol and water.
Color: Off-white
Odor: Mixture of moth balls and vinegar.
CAS No. 86-87-3



Technical Note: Use 0.1 to 10.0 mg/L solution as a plant hormone.

1-Naphthol

α-naphthol
laboratory grade, powder
$C_{10}H_8O$
F.W. 144.17

N0067	10 g	**$ 7.65**
N0033	25 g	**15.95**

★ **HAZARD ALERT:** Slightly toxic by ingestion, inhalation, and skin absorption; severe body tissue irritant. LD_{50} 1870 mg/kg.
Storage: Organic #8
Disposal: #18b
Shelf Life: Indefinite; darkens on exposure to light; protect from light.
Soluble: Alcohol, ether and benzene; slightly in water.
Color: Yellow/brown
Odor: Slight phenol
CAS No. 90-15-3



2-Naphthol-6-Sulfonic Acid, Sodium Salt

Schaeffer's salt
$C_{10}H_7O_4SNa$
F.W. 246.22

N0087	10 g	**$16.10**

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Light yellow to beige
Odor: None
CAS No. 135-76-2



Two-Step Accident Prevention

1. Identify the potential hazard.
2. Eliminate the hazard.

Example: You have long purchased acid in plain glass bottles. Should a break occur, a serious problem would result. Buy your acids in PVC (polyvinyl chloride) coated bottles. If a break occurs, you have a plastic sack full of broken glass and acid instead of a serious problem.

N-1-Naphthylethylenediamine Dihydrochloride

N-NED
for detection of nitrogen dioxide in air or quantitative reagent for sulfa drugs
$C_{12}H_{14}N_2 \bullet 2HCl$ **N0044** 5 g **$22.55**
F.W. 259.17 (Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Body tissue irritant.
Storage: Organic #2
Disposal: #26a
Shelf Life: Poor; hygroscopic.
Soluble: Hot water; alcohol; dilute hydrochloric acid.
Color: White
Odor: None
CAS No. 1465-25-4



Neodymium Chloride Solution

includes 50-mL square plastic bottle
for spectroscopy experiments
0.2 Molar
(as $NdCl_3 \bullet 6H_2O$) **N0086** 50 mL **$12.80**

★ **HAZARD ALERT:** Moderately toxic by ingestion. Body tissue irritant.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Soluble: Water
Color: Light violet
Odor: None
CAS No. 13477-89-9



Technical Note: Great solution for teaching absorption spectroscopy. Violet color provides a good line spectrum.

Nessler's Reagent

for ammonia test
contains: mercury(II) iodide, potassium iodide and sodium hydroxide **N0024** 100 mL **$14.65**
(Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Highly toxic by ingestion and skin absorption; corrosive to body tissue.
Storage: Inorganic #2
Disposal: #27f
Shelf Life: Fair
Color: Colorless
Odor: None



Neutral Red

basic red 5
biological stain/indicator
pH 6.8 red to 8.0 yellow
$C_{15}H_{17}ClN_4$ **N0057** 5 g **$14.70**
F.W. 288.78

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite

Continued on next column.

Nickel and Nickel Compounds as Carcinogens

In an issue of *The Journal of Chemical Education* a chemistry professor from Wisconsin wrote and questioned the characterization of nickel and nickel compounds as carcinogens. The hazard is nickel as a dust or a fume. We only add to chemophobia by not viewing these issues realistically. As the professor wrote, "Shall we all stop carrying pocket change?" Put on your thinking cap. Certainly we should label things as hazardous, but only in the context of their hazardous character.

NEUTRAL RED *continued*

Soluble: Water and alcohol
Color: Gray
Odor: None
CAS No. 553-24-2
C.I. #50040



Newton's Metal

see Onion's Fusible Alloy

Nichrome, Wire

bare
16 gauge (134 ft/lb) **N0040** 4 oz. **$12.95**
18 gauge (218 ft/lb) **N0041** 4 oz. **13.00**
22 gauge (545 ft/lb) **N0042** 4 oz. **15.40**

Storage: Inorganic #1
Disposal: #26a
Shelf Life: Indefinite
Color: Silver
Odor: None



CAN'T FIND A CHEMICAL?
1-800-452-1261
PLEASE CALL US!

Nickel

reagent grade, shot **N0068** 50 g **$ 6.75**
Ni **N0004** 100 g **9.10**
A.W. 58.69 **N0005** 500 g **29.50**

Storage: Inorganic #1
Disposal: #27a
Shelf Life: Indefinite
Soluble: Resists solution
Color: Silver
Odor: None
CAS No. 7440-02-0



Nickel(ous) Ammonium Sulfate

laboratory grade, crystal
$Ni(NH_4)_2(SO_4)_2 \bullet 6H_2O$ **N0006** 100 g **$8.60**
F.W. 395.00

★ **HAZARD ALERT:** Toxic by ingestion and inhalation; avoid dispersing this substance. Dispense with care. Nickel compounds are *known carcinogens* by inhalation of dust.
Storage: Inorganic #2
Disposal: #27f
Shelf Life: Decomposed by elevated temperature.
Soluble: Water; not alcohol.
Color: Aqua
Odor: None
CAS No. 15699-18-0



Nickel(ous) Chloride

nickel(II) chloride
reagent grade, crystal **N0069** 50 g **$ 6.35**
$NiCl_2 \bullet 6H_2O$ **N0007** 100 g **10.35**
F.W. 237.72 **N0008** 500 g **27.75**

★ **HAZARD ALERT:** Highly toxic by ingestion and inhalation; avoid dispersing this substance; dispense with care. Nickel compounds are *known carcinogens* by inhalation of dust. LD_{50} 105 mg/kg.
Storage: Inorganic #2 in a locked poisons cabinet.
Disposal: #27f
Shelf Life: Deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, alcohol and ammonium hydroxide.
Color: Green
Odor: None
CAS No. 7791-20-0



Nickel(ous) Chloride, Gramolpak

0.25 Molar
(as $NiCl_2 \cdot 6H_2O$) * **N0074** pkg. **$7.35**

For hazard alert, storage, disposal, etc., see Nickel Chloride, N0069.

*Gramolpak® is a unique package which makes 500 mL with distilled water.



Nickel(ous) Nitrate

nickel(II) nitrate
crystal
$Ni(NO_3)_2 \cdot 6H_2O$l
F.W. 290.82

Reagent	**N0009**	100 g	**$11.71**
	N0010	500 g	**35.41**
Laboratory grade	**N0090**	100 g	**$10.91**
	N0091	500 g	**21.61**

★ HAZARD ALERT: Slightly toxic; avoid dispersing this substance; dispense with care; strong oxidant. Nickel compounds are *known carcinogens* by inhalation of dust. LD_{50} 1620 mg/kg.
Storage: Inorganic #3
Disposal: #27f
Shelf Life: Deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, alcohol and ammonium hydroxide.
Color: Aqua
Odor: None
CAS No. 13478-00-7



Nickel(ous) Nitrate, Gramolpak

1 Molar
(as $Ni(NO_3)_2 \cdot 6H_2O$) * **N0075** pkg. **$7.55**

For hazard alert, storage, disposal, etc., see Nickel Nitrate, N0009.

*Gramolpak® is a unique package which makes 100 mL with distilled water.



Nickel Nitrate Solution

0.2 Molar
(as $Ni(NO_3)_2 \cdot 6H_2O$) **N0070** 500 mL **$7.70**

For hazard alert, storage, disposal, etc., see Nickel Nitrate, N0009.
Color: Green
Odor: None



Nickel(ous) Sulfate

nickel(II) sulfate
crystal
$NiSO_4 \cdot 6H_2O$
F.W. 262.87

Reagent	**N0011**	100 g	**$12.25**
	N0012	500 g	**26.50**
Laboratory grade	**N0013**	500 g	**$11.65**

★ HAZARD ALERT: Moderately toxic by ingestion and inhalation; severe body tissue irritant; avoid dispersing this substance; dispense with care. Nickel compounds are *known carcinogens* by inhalation of dust. LD_{50} 275 mg/kg.
Storage: Inorganic #2
Disposal: #27f
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Light green
Odor: None
CAS No. 10101-97-0



Nickel(ous) Sulfate, Gramolpak

1 Molar
(as $NiSO_4 \cdot 6H_2O$) * **N0076** pkg. **$8.10**

For hazard alert, storage, disposal, etc., see Nickel(ous) Sulfate, N0011.

*Gramolpak® is a unique package which makes 100 mL with distilled water.



Nicotine

laboratory grade
$C_{10}H_{14}N_2$ **N0058** 10 g **$25.05**
F.W. 162.24 (Packaged in PVC-coated bottles)

★ HAZARD ALERT: Highly toxic by ingestion, inhalation and skin absorption. LD_{50} 50 mg/kg. TLV 0.5 mg/m^3.
Storage: Organic #2 in a Flinn *Chem-Saf*® Bag in a locked poisons cabinet.
Disposal: #5
Shelf Life: Poor; substance deliquescent.
Soluble: Water and many common organic solvents.
Color: Amber
Odor: Strong; old smoked cigarettes.
CAS No. 54-11-5



Nigrosin

biological stain, water soluble
N0034 25 g **$33.70**

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Black
Odor: None
CAS No. 8005-03-6
C.I. #50420



Nigrosin Solution

saturated, aqueous **N0036** 100 mL **$13.95**
(Packaged in PVC-coated bottles)

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Color: Black
Odor: None



Ninhydrin

1, 2, 3-indantrione monohydrate
used in test for amino acids and proteins
laboratory grade, crystal
C_6H_4-1,2-$(CO)_2CO \cdot H_2O$ **N0072** 5 g **$ 9.70**
F.W. 195.15 **N0015** 10 g **14.70**
(Both package sizes packaged in PVC-coated bottles)

★ HAZARD ALERT: Body tissue irritant.
Storage: Organic #2 in a Flinn *Chem-Saf*® Bag.
Disposal: #18b
Shelf Life: Indefinite, but light sensitive.
Soluble: Alcohol and water
Color: White
Odor: Fresh paint
CAS No. 485-47-2



Technical Note: Use a 0.5% solution of ninhydrin in ethyl, isopropyl, or butyl alcohol to test for proteins and amino acids.

What Is a Body Tissue Irritant?

Many chemical substances are classified as body tissue irritants. This is a very broad and general statement that simply means: Avoid getting this material in your eyes or on your skin—it may cause itching, irritation, or a rash. The symptoms depend on the part of the body exposed, the duration of contact, and your body's reaction to the chemical. Different people react differently to specific chemicals. Bottom line, always wear gloves, goggles, and aprons when handling these materials.

Ninhydrin Solution

0.5% in butyl alcohol reagent

N0039	100 mL	**$ 9.20**
N0023	500 mL	**13.65**

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Review the detailed hazard data provided for ninhydrin. The solution contains butanol, which is a flammable liquid. Severe body tissue irritant.

Storage: Organic #2 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.

Disposal: #18b

Shelf Life: Indefinite if stored safely.

Color: Amber

Odor: Butyl alcohol



Nitric Acid

ACS reagent
15.8 Molar
assay 69.0–71.0 wt %
HNO_3
F.W. 63.01

N0043	100 mL	**$ 9.91**

(Packaged in PVC-coated bottle)

N0016	500 mL	**16.71**
N0017	2.5 liters	**28.91**
* **N0055**	2.5 liters	**29.41**

(Flinn *Plas-Pak*® PVC-coated bottle)

★ **HAZARD ALERT:** Corrosive; strong oxidant; toxic by inhalation and ingestion; avoid contact with acetic acid and readily oxidized substances. Concentrated nitric acid will attack and destroy most plastics; never store concentrated nitric acid in a plastic bottle. TLV 5.2 mg/m^3.

Storage: In a separate, isolated portion of your acid cabinet. **Never store with acetic acid.** If an acid cabinet is not available, store in a Flinn *Saf-Cube*®.

Cap Safety Color Code: Red

Disposal: #24b

Shelf Life: When this substance is stored for a long period, it gradually destroys the cap. *Do not interchange another cap except one designated by its color code (red).* Contact Flinn for a replacement cap, if needed. Shelf life of nitric acid is good except for this bottle cap problem. Product may turn yellow due to the release of nitrogen dioxide on exposure to light. This yellow color does not affect the product's usefulness in the school laboratory.

Soluble: Miscible with water; considerable heat is released.

Color: Colorless

Odor: Suffocating; unique odor.

CAS No. 7697-37-2



Safety Purchase Suggestion: Buy and store only small package sizes and small quantities. For safety reasons, Flinn offers

Continued on next column.

NITRIC ACID *continued*

larger sizes of nitric acid and other hazardous substances in PVC-coated bottles. We have attempted to price the products in these safer containers as low as possible.

* Nitric acid is exactly as described under catalog number N0017 but in a PVC-coated bottle. In the event of breakage, acid and glass shards are safely retained in a PVC outer envelope. *Plas-Pak*® is a safer package for science teachers.

Nitric Acid, Gramolpak

1 Molar
(as HNO_3)

* **N0053**	pkg.	**$15.61**

For hazard alert, storage, disposal, etc., see Nitric Acid, N0043.

* Gramolpak® is a unique package which makes 1 liter with distilled water.



Nitric Acid Solution

8 Molar*	**N0047**	500 mL	**$18.01**
6 Molar†	**N0048**	500 mL	**11.41**
3 Molar†	**N0049**	500 mL	**10.20**
1 Molar§	**N0050**	500 mL	**7.45**
0.5 Molar¶	**N0051**	500 mL	**6.50**
0.1 Molar¶	**N0052**	500 mL	**6.20**

(All above concentrations packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Corrosive; strong oxidizing solution; avoid contact with acetic acid and readily-oxidized substances.

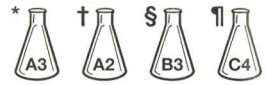
Storage: In a separate, isolated portion of your dedicated acid cabinet. Never store near acetic acid.

Disposal: #24b

Shelf Life: Good

Color: Colorless

Odor: Slight nitric acid



4′-Nitroacetanilide

laboratory grade, powder
$CH_3CONHC_6H_4NO_2$
F.W. 180.16
M.P. 216 °C

N0060	25 g	**$22.55**
N0061	100 g	**88.95**

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Body tissue irritant.

Storage: Organic #2

Disposal: #18b

Shelf Life: Fair

Soluble: Hot water, organic solvents.

Color: Pea green

Odor: None

CAS No. 104-04-1



Flinn Acids: The Safer Choice

Nitric acid is an essential part of any chemical laboratory but is also one of the more hazardous. Flinn makes it safer by providing PVC-coated bottles, Flinn *Saf-Cube*®, and premixed solutions.

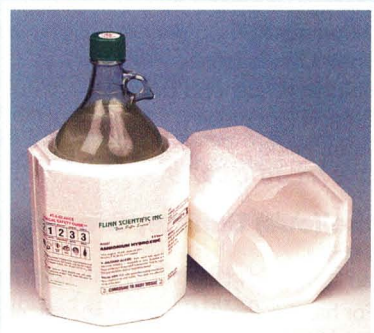


Safer Bottles: Please order the 2.5 L nitric acid in the *Plas-Pak*® bottle (N0055). These PVC-coated bottles are lifesavers!

***Saf-Cube*®:** All 15.8 M nitric acid bottles are shipped in Flinn *Saf-Cubes* for your protection. Don't throw these valuable containers away. They make great storage containers if no acid cabinet is available.

Premixed Solutions: Consider buying Flinn premixed acid solutions. They save time and are safer to store than concentrated acids. If you make your own solutions…

Always Add Acid to Water!



o-Nitrobenzaldehyde

laboratory grade, powder
$C_7H_5O_3$ N0078 10 g $19.40
F.W. 151.12

★ **HAZARD ALERT:** Moderately toxic by ingestion. Body tissue irritant. LD_{50} 600 mg/kg.
Storage: Organic #3
Disposal: #2
Shelf Life: Indefinite
Soluble: Slightly soluble in water; soluble in alcohol, ether, and acetone.
Color: Buff
Odor: None
CAS No. 552-89-6
Technical Note: Use in the preparation of indigo dye.



Nitrogen Gas

Lecture bottle LB1020 2 cu. ft. (56 liters) $107.51
Refillable cylinder LB1075 4 cu. ft. (112 liters) 214.21

Storage: In an area dedicated to bottled gases and away from any source of heat or flame.
Disposal: Completely empty lecture bottle, then follow #26a.
Shelf Life: Indefinite if stored safely.
Soluble: Slightly in water and alcohol.
Color: None
Odor: None
CAS No. 7727-37-9
Special Note: Nitrogen gas lecture bottle is color-coded solid pink.



Purchase Suggestion

If you use a lot of gases, consider our refillable gas cylinders. They provide more gas, eliminate disposal problems and save you money. See page 249 of this Catalog/Reference Manual for more information.

Nitrogen Dioxide

see Diffusion Tubes, Nitrogen Dioxide (AP8476) on page 313

meta-Nitrophenol

3-nitrophenol
$O_2NC_6H_4OH$ N0088 25 g $46.60
F.W. 139.11 (Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Moderately toxic by ingestion, inhalation, and skin absorption; body tissue irritant. LD_{50} 328 mg/kg.
Storage: Organic #8
Disposal: #18b
Shelf Life: Good
Soluble: Hot water; alcohol; ether.
Color: Yellowish
Odor: None
CAS No. 554-84-7
Technical Note: Provides brighter colors than p-nitrophenol in various "rainbow" chemical demonstrations.



para-Nitrophenol

4-nitrophenol
reagent grade
$O_2NC_6H_4OH$ N0073 25 g $8.90
F.W. 139.11 (Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Highly toxic by ingestion, inhalation, and skin absorption; body tissue irritant. LD_{50} 250 mg/kg.

Continued on next column.

para-NITROPHENOL *continued*

Storage: Organic #8
Disposal: #18b
Shelf Life: Good
Soluble: Hot water; alcohol; ether.
Color: Yellowish
Odor: None
CAS No. 100-02-7



4-(p-Nitrophenylazo) resorcinol

magneson
qualitative reagent for the detection of magnesium
$C_{12}H_9N_3O_4$ N0056 5 g $17.15
F.W. 259.22 N0031 10 g 26.15
N0032 25 g 59.50

Storage: Organic #8
Disposal: #5
Shelf Life: Indefinite
Soluble: Insoluble in water; soluble in dilute sodium hydroxide solution.
Color: Red/brown
Odor: None
CAS No. 74-39-5
Technical Note: Sometimes known as "magneson." Brownish red powder for the detection of magnesium by turning bright blue in color. May also be used as an indicator for molybdenum where color is red violet.



4-(p-Nitrophenylazo) resorcinol Solution

N0062 100 mL $7.20

★ **HAZARD ALERT:** Corrosive liquid; burns tissue; very dangerous to eyes; wear gloves.
Storage: Inorganic #4
Disposal: #10
Shelf Life: Good
Color: Purple
Odor: None
Technical Note: Ready-to-use indicator solution for magnesium and molybdenum. Contains 0.01 g N0056 in 100 mL of 1 M NaOH solution.



Nucleic Acids

see Deoxyribonucleic Acid and Ribonucleic Acid

Nutmeg

ground nutmeg, powder
N0079 25 g $5.60

Storage: Miscellaneous, nonhazardous organic material.
Disposal: #26a
Shelf Life: Indefinite
Color: Brown
Odor: Spicy, fragrant
Technical Note: Source of a triglyceride, trimyristin, in a natural products experiment. Used in *Vial Organic™ II*.



Nitric Acid—The Destroyer

Nitric acid attacks all metals with a vengeance! When it is warm and humid, the substance fumes continuously. This is the acid most responsible for metal damage in the area where your acid is stored. Keeping nitric acid fumes diluted or under control is the key. Provide lots of air movement or isolate the substance in a container like the entirely metal-free Flinn Acid Cabinet.

Nutrient Agar

bacteriological media

N0092	23 g	$ 9.80
N0019	100 g	27.60
N0020	500 g	71.95

Storage: Miscellaneous non-hazardous organic material.
Disposal: #26a
Shelf Life: Must be kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: Buff
Odor: Strong; putrid.
Technical Note: N0092 is a premeasured amount of nutrient agar to make 1 liter of nutrient agar culture medium.

Nutrient Agar, Culture Tubes

prepared media in tubes

N0064	pkg./ 6 tubes	$9.15

For storage, disposal, etc., see Nutrient Agar, N0019.
Color: Buff
Odor: Strong; putrid.

Nutrient Broth

bacteriological media

N0021	100 g	$31.10
N0022	500 g	84.25

Storage: Miscellaneous, non-hazardous organic material.
Disposal: #26a
Shelf Life: Must be kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: Buff
Odor: Strong; putrid.
Technical Note: Best choice for growing cultures in liquid media.

O

Octadecanoic Acid

see Stearic Acid

1-Octadecanol

stearyl alcohol
flake
$CH_3(CH_2)_{16}CH_2OH$
F.W. 270.48

Q0017	100 g	$ 9.40
Q0012	500 g	22.80

Storage: Organic #2
Disposal: #18b
Shelf Life: Indefinite
Soluble: Many common organic solvents.
Color: White
Odor: Soap
CAS No. 112-92-5
Technical Note: A safer alternative for melting point determination: melting point is 56–60 °C.

We Didn't Know About It Yesterday!

We have added the hazard alert about the peroxidizable character of some alcohols, such as 2-octanol, to our chemical listings. This development may not be new; however, one of the many benefits of the *Flinn Scientific Catalog/Reference Manual* is that it keeps science teachers up-to-date. What does your low-bid chemical supplier do to help you?

1-Octanol

caprylic or n-octyl alcohol
$CH_3(CH_2)_7OH$
F.W. 130.23

Q0024	50 mL	$ 5.80
Q0018	100 mL	9.20
Q0014	500 mL	23.75

★ **HAZARD ALERT:** Body tissue irritant; slightly toxic. LD_{50} 1790 mg/kg.
Storage: Organic #2
Disposal: #18b
Shelf Life: Indefinite
Soluble: Miscible with alcohol, chloroform and mineral oil; immiscible with water and glycerin.
Color: Colorless
Odor: Strong; floral.
CAS No. 111-87-5
Technical Note: The designation capryl alcohol is frequently used for both 1-octanol and 2-octanol. We've elected to designate the normal primary alcohol as 1-octanol.

2-Octanol

laboratory grade
$CH_3(CH_2)_5CH(OH)CH_3$
F.W. 130.23

Q0023	100 mL	$ 9.10
Q0013	500 mL	32.05

★ **HAZARD ALERT:** May be body tissue irritant; substance may develop explosive peroxides upon aging; do not distill to dryness.
Storage: Organic #2
Disposal: #18b
Shelf Life: Poor; note Hazard Alert.
Soluble: Slightly in water; miscible with alcohol.
Color: Colorless
Odor: Strong; floral.
CAS No. 123-96-6

4-(t-Octyl) Phenol

TOP
laboratory grade, powder
$C_8H_{17}C_6H_4OH$
F.W. 206.33

Q0031	100 g	$ 9.50
Q0032	500 g	16.85

★ **HAZARD ALERT:** Irritating to body tissue; slightly toxic by ingestion. LD_{50} 3210 mg/kg.
Storage: Organic #8
Disposal: #24a
Shelf Life: Indefinite
Soluble: Alcohol, xylenes and acetone
Color: White
Odor: Sweet moth balls
CAS No. 140-66-9
Technical Note: A safer alternative for melting point determination: melting point is 79–82 °C.

Oils

see individual listings (cedarwood, paraffin, etc.)

Oil Encapsulant

H-100, oil absorbing material

Q0033	100 g	$11.10

Storage: Miscellaneous non-hazardous organic material.
Disposal: #26a, when used as an absorbent, follow procedure for absorbed material.
Shelf Life: Indefinite
Soluble: Insoluble
Color: White
Odor: None
Technical Note: Use with Marvel Mystery Oil (AP8927) to simulate an oil spill cleanup; please see page 451.

Oleic Acid

fatty acid
laboratory grade
$C_{18}H_{34}O_2$
F.W. 282.47

Q0025	100 mL	$ 7.95
Q0003	500 mL	13.70

(Both package sizes packaged in PVC-coated bottles)

Storage: Organic #1
Disposal: #24a
Shelf Life: Darkens on exposure to air; keep tightly closed; store in a Flinn *Chem-Saf*® Bag.
Soluble: Many organic solvents; not water.
Color: Colorless
Odor: Wax-like
CAS No. 112-80-1



Olive Oil

laboratory grade — Q0004 — 200 mL — $6.95

Storage: Organic #3
Disposal: #26a
Shelf Life: Indefinite if kept tightly closed; store in a Flinn *Chem-Saf*® Bag.
Soluble: Carbon disulfide, chloroform and ether; slightly in alcohol.
Color: Yellow
Odor: Slight pleasant odor
CAS No. 8001-25-0
Technical Note: Not for human consumption.





Onion's Fusible Alloy

cadmium-free alloy with a low melting point as an alternative to Wood's Metal
Ingredients: bismuth, lead, tin

Q0026	50 g	$11.50
Q0021	100 g	17.35

Storage: Inorganic #1
Disposal: #27d
Shelf Life: Indefinite
Color: Metallic gray
Odor: None
Technical Note: Onion's Fusible Alloy is a safer choice as a metal alloy in lieu of high lead- or cadmium-containing alloys. This alloy has a melting point about 15 °F (8 °C) below the boiling point of water. Students are enthusiastic about the use of this alloy particularly since it melts before water boils.



Orange G

acid orange 10
biological stain or indicator
pH 11.5 yellow to 14.0 pink

Q0027 — 10 g — $17.90

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Orange
Odor: None
CAS No. 1936-15-8
C.I. #16230



Orange III

see Methyl Orange

Orange IV

acid orange 5
biological stain or indicator
pH 1.4 red to 2.6 yellow

Q0009 — 10 g — $13.70

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Orange
Odor: None
CAS No. 554-73-4
C.I. #13080



Orange IV Indicator Solution

0.1%, aqueous

Q0020 — 100 mL — $6.65

Storage: Organic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Orange
Odor: None



Orcein

biological stain — Q0010 — 1 g — $13.00

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Alcohol, acetone, and dilute alkali solutions.
Color: Gray/black
Odor: None
CAS No. 1400-62-0



Orcinol

orcin
reagent for certain carbohydrates
5-$CH_3C_6H_3$-1,3-$(OH)_2 \bullet H_2O$
F.W. 142.15 — Q0015 — 1.5 g — $10.85

★ **HAZARD ALERT:** Body tissue irritant; moderately toxic by ingestion. LD_{50} 844 mg/kg.
Storage: Organic #8
Disposal: #18b
Shelf Life: Indefinite but light-sensitive.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 6153-39-5



Ortho Phosphoric Acid

see Phosphoric Acid

Chemical Donations

Teachers tell us about a company or college that gave them laboratory chemicals as a gift. Most of the substances are of no use to the school. The school has inherited someone else's disposal problem. Never take chemical donations! Accept only equipment and glassware you know you can use.

Oxalic Acid

crystal
$H_2C_2O_4 \cdot 2H_2O$
F.W. 126.07

Reagent	**Q0005**	100 g	**$ 8.90**
	Q0007	500 g	**23.80**
Laboratory grade	**Q0006**	500 g	**$10.50**

★ **HAZARD ALERT:** Skin and eye irritant; moderately toxic by ingestion. LD_{50} 375 mg/kg. TLV 1 mg/m^3.
Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Water and many common organic solvents
Color: White
Odor: None
CAS No. 6153-56-6



Oxalic Acid, Gramolpak

0.1 Molar
(as $H_2C_2O_4 \cdot 2H_2O$) ***Q0030** pkg. **$5.95**

For hazard alert, storage, disposal, etc., see Oxalic Acid, Q0005.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Oxygen Gas

Lecture bottle	**LB1025**	2 cu. ft. (56 liters)	**$109.21**
Refillable cylinder	**LB1080**	3.4 cu. ft. (95 liters)	**214.21**

★ **HAZARD ALERT:** Fire risk.
Storage: In an area dedicated to bottled gases; store away from any source of heat or flame.
Disposal: Completely empty lecture bottle, then follow #26a.
Shelf Life: Indefinite if stored safely.
Soluble: Slightly soluble in water and alcohol.
Color: None
Odor: None
CAS No. 7782-44-7



Special Note: Oxygen gas lecture bottle is color-coded solid blue.

Technical Note: Oxygen can be generated by using 30% hydrogen peroxide (H_2O_2). It is vital that you give 30% H_2O_2 your highest level of safety consciousness; it is a very hazardous substance.

Set up the apparatus to create a gas generator. A 250-mL flask, a two-hole rubber stopper, a delivery tube and a dropping funnel will be required. A drying tube containing anhydrous calcium chloride (Flinn C0016 or C0017) or Drierite® (Flinn D0011 or D0012) will be required since the O_2 will have an undesirably high water content. Place two grams of manganese dioxide (Flinn M0025 or M0026) in the flask. Now dilute 50 mL of 30% H_2O_2 to 100 mL using distilled water. Add H_2O_2 dropwise through the dropping funnel into the flask. This process will generate about 6 liters of oxygen. **Do Not Use Potassium Chlorate to Generate Oxygen.**

Sunlight

Various substances react differently to the warm rays of the sun. Sometimes such intense heat will cause pressure to develop within a container or may lead to substance deterioration. Some chemicals are light sensitive and decompose when exposed to light over long periods of time. Try to arrange your chemical stores area to prevent containers of chemicals from being exposed to direct sunlight.

P

Palmitic Acid

hexadecanoic acid
laboratory grade, powder
$CH_3(CH_2)_{14}CO_2H$ **P0129** 100 g **$15.55**
F.W. 256.43
Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Hot alcohol; not water.
Color: White
Odor: Wax-like
CAS No. 57-10-3
Technical Note: Melting point 61–64 °C.



Pancreatin

enzyme **P0001** 25 g **$5.80**
laboratory grade, powder **P0002** 100 g **9.85**
Storage: Organic #2
Disposal: #26a
Shelf Life: Good, but only if kept refrigerated.
Soluble: Partially in water; not in alcohol.
Color: Off-white
Odor: Sour malt
CAS No. 8049-47-6



Purchase Suggestion

If you use a lot of gases, consider our refillable gas cylinders. They provide more gas, eliminate disposal problems and save you money.

See page 249 of this Catalog/Reference Manual for more information.



Pancreatin Solution

"Pancreatic Juice"
contents: pancreatin, water, sodium bicarbonate
P0212 50 mL **$5.45**
Storage: Organic #2
Disposal: #26a
Shelf Life: Good if kept refrigerated.
Color: Cloudy
Odor: Sour milk



Papain

proteolytic enzyme **P0260** 100 g **$32.90**
Storage: Organic #2
Disposal: #26a
Shelf Life: Fair; store cold.
Soluble: Partially soluble in water and glycerol.
Color: Grayish-white
Odor: Papaya
CAS No. 9001-73-4



para-Dichlorobenzene

see 1,4-Dichlorobenzene

Paraffin Oil

see Mineral Oil

Paraffin, Wax

laboratory grade — P0003 — 1 lb — $2.65

Storage: Organic #3
Disposal: #26a
Shelf Life: Indefinite
Soluble: Warm alcohol; chloroform; petroleum ether, olive oil and other organic solvents.
Color: Waxy white
Odor: None
CAS No. 8002-74-2



Peanut Oil

laboratory grade — P0004 — 500 mL — $8.95

Storage: Organic #3
Disposal: #26a
Shelf Life: Indefinite
Soluble: Slightly in alcohol; not water.
Color: Amber
Odor: Peanuts
Note: Not for human consumption.



Penicillin G Sodium

powder — P0111 — 6 g — $16.15
approx. 1650 units per mg

★ **HAZARD ALERT:** Possible sensitizer.
Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: White
Odor: None
CAS No. 69-57-8



Pentane

laboratory grade
$CH_3(CH_2)_3CH_3$ — P0213 — 100 mL — $7.21
F.W. 72.15

★ **HAZARD ALERT:** Flammable liquid; narcotic in high concentrations. TLV 1770 mg/m^3.
Storage: Organic #3 in an approved flammables cabinet.
Disposal: #18b
Shelf Life: Indefinite
Soluble: Miscible with alcohol and many other organic solvents.
Color: Colorless
Odor: Gasoline-like
CAS No. 109-66-0



1-Pentanol

see n-Amyl Alcohol

FLINN PRICES ARE GUARANTEED FOR A FULL YEAR

Pentyl Alcohol

see n-Amyl Alcohol

Peppermint Oil

laboratory grade — P0005 — 25 mL — $11.05
(Packaged in PVC-coated bottles)

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Slightly in water and alcohol.
Color: Colorless
Odor: Peppermint
CAS No. 8006-90-4
Technical Note: Not for human consumption.



Pepsin

enzyme
laboratory grade, powder
Activity: 1:3000 — P0006 — 25 g — $ 7.70
P0007 — 100 g — 14.45

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: Buff
Odor: Sour malt
CAS No. 9001-75-6
Technical Note: Use a 0.5% solution for protein digestion.



Peptone

bacteriological media — P0008 — 25 g — $ 6.75
laboratory grade — P0009 — 100 g — 9.30
P0010 — 500 g — 36.35

Storage: Miscellaneous non-hazardous organic material.
Disposal: #26a
Shelf Life: Indefinite if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: Light yellow/brown
Odor: Sour malt



Perchloroethylene

tetrachloroethylene
$Cl_2C=CCl_2$ — P0267 — 100 mL — $ 5.93
F.W. 165.85 — P0268 — 500 mL — 15.43

★ **HAZARD ALERT:** Irritant to skin, eyes and respiratory tract. Slightly toxic; *possible carcinogen*. LD_{50} 1100 mg/kg. TLV 339 mg/m^3.
Storage: Organic #4
Disposal: #4b
Shelf Life: Good
Soluble: Alcohol, ether, oils; insoluble in water.
Color: Colorless
Odor: Ether-like
CAS No. 127-18-4
Technical Note: Specific gravity 1.6; boiling point 120–122 °C.



Petrolatum

white petroleum jelly — P0230 — 28 g — $3.95
laboratory grade — P0012 — 500 g — 7.05

Storage: Organic #3
Disposal: #26a
Shelf Life: Indefinite
Soluble: Many organic solvents; not water.
Color: Yellow
Odor: None
CAS No. 8009-03-8



What To Do in an Emergency?

More than 95% of the science teachers we talk to tell us their school has no emergency action plan for the science department. Come on…don't wait for the administrators to act. **You** get this much-needed action started. You need a fire plan, you need an eye injury plan, you need a burn plan, you need an acid contact plan…don't wait for the event to happen. Please, this is high priority stuff!

Petroleum Ether

ligroine

Reagent	**P0214**	100 mL	**$ 6.45**
	P0014	500 mL	**8.95**
	P0015	4 liters	**31.61**
Laboratory grade	**P0275**	500 mL	**$ 7.65**

★ **HAZARD ALERT:** Flammable liquid; dangerous fire risk.

Storage: Organic #3 in a dedicated flammables cabinet. If a flammables cabinet is not available store in a Flinn *Saf-Stor®* Can.

Disposal: #18a

Shelf Life: Indefinite if stored safely.

Soluble: Miscible with many organic solvents; insoluble in water.

Color: Colorless

Odor: Like natural gas

CAS No. 8032-32-4



Technical Note: Technically the name petroleum ether is a misnomer. In the chemical sense it is not an ether, but consists chiefly of low boiling fractions (B.P. 30–60 °C) of petroleum, mostly pentanes and hexanes. Names like benzin and naphtha are synonymous to petroleum ether, which is not a peroxidizable substance like ethyl ether.

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www.flinnsci.com

1,10-Phenanthroline

o-phenanthroline
reagent grade, granular

$C_{12}H_8N_2 \bullet H_2O$	**P0282**	1 g	**$ 9.50**
F.W. 198.21	**P0155**	5 g	**29.90**

★ **HAZARD ALERT:** Highly toxic by ingestion; LD_{50} 132 mg/kg.

Storage: Organic #2

Disposal: #5

Shelf Life: Poor; hygroscopic.

Soluble: Alcohol; slightly in water.

Color: White

Odor: None

CAS No. 5144-89-8



Technical Note: Forms a complex with ferrous ions called ferroin (see page 87), which is used as an indicator in redox systems.

1,10-Phenanthroline Solution

0.1%, aqueous
indicator solution in redox systems, e.g., ferrous salts

P0215	100 mL	**$10.95**

For hazard alert, storage, disposal, etc., see 1,10-Phenanthroline, P0155.

Color: Clear

Odor: None



Goggle Use

When is it appropriate to wear goggles? To this question science teachers usually respond by citing specific situations, i.e., when working with strong bases; when working with acids; when working with biuret; etc. If you would like a good but general rule it would simply be...WORKING WITH CHEMICALS? ANY CHEMICAL?... WEAR GOGGLES!

GOGGLES...WEAR 'EM WHENEVER USING CHEMICALS!

Phenol

carbolic acid
laboratory grade
C_6H_5OH
F.W. 94.11

Loose crystals	**P0130**	25 g	**$ 6.70**
stabilized with	**P0104**	100 g	**20.13**
hypophosphorus acid	**P0105**	500 g	**44.63**
Liquid, 88%	**P0131**	100 mL	**$15.03**
	P0102	500 mL	**34.33**

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Toxic by ingestion, inhalation and skin absorption. Strong skin irritant; LD_{50} 384 mg/kg. TLV 19 mg/m^3.

★ **SPECIAL HAZARD ALERT:** Phenol in contact with more than approximately 100 square inches of skin (10″ × 10″) is absorbed so quickly through intact skin as to be fatal in 90 seconds—unless promptly and completely washed off by scrubbing with a cloth under a copious quantity of flowing water (like a safety shower). Drench affected area quickly and thoroughly!

Storage: Organic #8 in a Flinn *Chem-Saf®* Bag.

Disposal: #24a

Shelf Life: Changes color on exposure to light; absorbs water from air and liquefies.

Soluble: Water and many organic solvents.

Color: White or colorless

Odor: Disinfectant

CAS No. 108-95-2



Phenol Solution

5%, aqueous	**P0103**	500 mL	**$17.03**

★ **HAZARD ALERT:** Moderately toxic by ingestion, inhalation, and skin absorption; avoid skin contact.

Storage: Organic #8

Disposal: #26b

Shelf Life: Good

Color: Colorless

Odor: Slight disinfectant





See page 37 for a detailed explanation of the Flinn Hazard and Usefulness Code.

Phenol Red

indicator, sodium salt
pH 6.8 yellow to 8.4 red
reagent

$C_{19}H_{13}NaO_5S$	**P0097**	1 g	**$ 5.95**
F.W. 376.36	**P0188**	5 g	**11.95**

Storage: Organic #9

Disposal: #26a

Shelf Life: Indefinite

Soluble: Water

Color: Red

Odor: None

CAS No. 34487-61-1



Phenol Red Indicator Solution

0.02%, aqueous

P0100	100 mL	**$4.15**
P0101	500 mL	**9.35**

Storage: Organic #9

Disposal: #26b

Shelf Life: Good

Color: Red

Odor: None



Phenolphthalein

indicator, powder
pH 8.2 colorless to 10.0 pink
$C_{20}H_{14}O_4$
F.W. 318.31

Reagent	**P0017**	25 g	**$ 6.55**
	P0018	100 g	**13.85**
	P0193	500 g	**47.65**
Laboratory grade	**P0276**	100 g	**$10.90**

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Alcohol and alkalies; insoluble in water.
Color: White
Odor: None
CAS No. 77-09-8



Phenolphthalein Indicator Solution

Alcoholic			
1%	**P0019**	100 mL	**$3.95**
	P0020	500 mL	**5.80**
0.5%	**P0115**	100 mL	**$4.05**
	P0116	500 mL	**5.80**

★ **HAZARD ALERT:** Alcohol solution; flammable liquid; fire risk; moderately toxic.
Storage: Organic #9 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Indefinite
Color: Colorless
Odor: Alcohol



Phenylhydrazine Hydrochloride

reagent grade
$C_6H_5NHNH_2 \bullet HCl$ **P0118** 100 g **$63.55**
F.W. 144.61

★ **HAZARD ALERT:** Harmful as dust or vapor to skin and eyes. Dangerous if heated to decomposition.
Storage: Organic #2
Disposal: #16
Shelf Life: Good; color darkens on exposure to air.
Soluble: Common organic solvents; slightly in water.
Color: Gray/white
Odor: Strong chlorine
CAS No. 59-88-1



Phenyl Salicylate

salol
laboratory grade, crystal
$2\text{-}HOC_6H_4\text{-}1\text{-}CO_2C_6H_5$
F.W. 214.22

P0216	50 g	**$ 6.50**
P0021	100 g	**10.95**
P0022	500 g	**27.20**

★ **HAZARD ALERT:** Slightly toxic by ingestion. LD_{50} 3000 mg/kg.
Storage: Organic #3
Disposal: #18b
Shelf Life: Indefinite
Soluble: Slightly in water; most common organic solvents.
Color: White
Odor: Disinfectant
CAS No. 118-55-8
Technical Note: Melting point 44–46 °C.



Phenyl Thiocarbamide

phenyl thiourea, PTC	**P0217**	10 g	**$10.95**
powder	**P0106**	25 g	**16.25**

★ **HAZARD ALERT:** Highly toxic by ingestion; LD_{50} 3 mg/kg.
Storage: Organic #2 in a Flinn *Chem-Saf*® Bag in a locked poisons cabinet.

Continued on next column.

PHENYL THIOCARBAMIDE *continued*

Disposal: #13
Shelf Life: Indefinite
Soluble: Hot water and alcohol
Color: White
Odor: Garlic-like
CAS No. 103-85-5



Phloroglucinol

reagent grade, powder
$C_6H_3\text{-}1,3,5\text{-}(OH)_3 \bullet 2H_2O$ **P0120** 25 g **$23.40**
F.W. 162.15

Storage: Organic #8
Disposal: #18b
Shelf Life: Indefinite but light-sensitive.
Soluble: Alcohol, ether; slightly in water.
Color: Off-white to white
Odor: None
CAS No. 6099-90-7



Are You Receiving Fresh Chemicals?

You're always guaranteed to receive high quality chemicals from Flinn Scientific. For example, very deliquescent materials (e.g., $BiCl_3$) are packaged in a PVC-coated bottle inside a Flinn *Chem-Saf*® bag with a packet of desiccant to ensure freshness. Does your chemical supplier do this?



Phloroglucinol: HCl Solution

1%
Technical Note: Prepare this solution by mixing 1 g of phloroglucinol in 100 mL of water. Now add 100 mL of concentrated hydrochloric acid. Solution to test for pentose or galactose must be used in 5–7 days. Solution not stable beyond that period.

Phosphomolybdic Acid

reagent, crystal
$P_2O_5 \bullet 24MoO_3 \bullet xH_2O$ **P0122** 10 g **$52.60**
F.W. 3596.48 + xH_2O

★ **HAZARD ALERT:** Corrosive to body tissues.
Storage: Inorganic #9 (*not* in an acid cabinet).
Disposal: #6
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Yellow
Odor: Plastic-like
CAS No. 51429-74-4



PTC Paper

PTC paper is prepared by soaking paper with phenyl thiocarbamide (PTC). The LD_{50} for PTC is 3.4 mg/kg. Such a low LD_{50} suggests this is a very toxic substance. The solution to make the taste test paper contains approximately 500 mg of PTC per liter of water. Each strip of PTC paper therefore contains approximately 3/10 of a milligram of PTC. A student would have to lick and ingest almost 500 2″ × ¼″ strips of PTC paper to reach the LD_{50} for a body weight of 50 kilograms.

o-Phosphoric Acid

orthophosphoric acid

14.8 Molar	**P0201**	100 mL	**$11.31**
reagent	**P0023**	500 mL	**18.61**
H_3PO_4	**P0024**	2.5 liters	**36.21**
F.W. 98.00	* **P0181**	2.5 liters	**40.21**
		(Packaged in PVC-coated bottle)	

★ **HAZARD ALERT:** Skin and eye irritant; slightly toxic by ingestion and inhalation; corrosive; burns tissue. LD_{50} 1530 mg/kg. TLV 1 mg/m^3.

Storage: Inorganic #9 in a dedicated acid cabinet. If one is not available, store in a Flinn *Saf-Cube*®.

Disposal: #24b

Shelf Life: Good if stored safely.

Cap Safety Color Code: White

Soluble: Water (heat generated) and alcohol

Color: Colorless

Odor: None

CAS No. 7664-38-2



Safety Purchase Suggestion: Buy and store only small package sizes and small quantities. For safety reasons, Flinn offers larger sizes of phosphoric acid and other hazardous substances in PVC coated bottles. We have attempted to price the products in these safer containers as low as possible.

*Phosphoric acid is exactly as described under catalog numbe P0024 but in a PVC-coated bottle. In the event of breakage, acid and glass shards are safely retained in a PVC outer envelope. *Plas-Pak*® is a safer package for science teachers.

Phosphorus, Red

Red phosphorus has been designated a controlled substance by the Drug Enforcement Agency (DEA) and is no longer available for sale. Customers who wish to purchase red phosphorus must register with the DEA and pay a fee.

Phosphoric Anhydride

see Phosphorus Pentoxide

Phosphorus Pentoxide

phosphoric anhydride
reagent grade, powder

P_2O_5	**P0219**	100 g	**$28.11**
F.W. 141.95		(Packaged in PVC-coated bottle, and then in a metal can for safer storage.)	

★ **HAZARD ALERT:** Severely corrosive substance; reacts violently with water; moderately toxic. LD_{50} 660 mg/kg.

Storage: Inorganic #10 in a Flinn *Saf-Stor*® Can.

Disposal: #24b

Shelf Life: Poor; readily absorbs water; amount of water absorbed then determines its nature as a phosphoric acid.

Soluble: Water

Color: White

Odor: None

CAS No. 1314-56-3



Safe Storage

The Flinn Scientific Chemical Storage Pattern emphasizes the storage of chemicals based on compatible chemical families. See pages 965–969 for a complete description and explanation of the Flinn Storage System.

Phthalic Anhydride

reagent grade, flake

$C_8H_4O_3$	**P0132**	100 g	**$ 7.55**
F.W. 148.11	**P0028**	500 g	**13.95**

Storage: Organic #1

Disposal: #24a

Shelf Life: Poor; moisture sensitive.

Soluble: Alcohol, hot water and carbon disulfide.

Color: White

Odor: None

CAS No. 85-44-9



CAN'T FIND A CHEMICAL?
1-800-452-1261
PLEASE CALL US!

Picric Acid

saturated aqueous solution

	P0125	500 mL	**$37.05**

★ **HAZARD ALERT:** Poison; corrosive liquid possibly absorbed through the skin; *if allowed to dry, the solid is a powerful explosive.* TLV 0.1 mg/m^3.

Storage: Organic #8 *always kept moist with not less than half its own weight of water.* If you cannot assure that this product will be kept wet and cool, please do not store it on school premises. **Never store more than 500 mL.**

Disposal: #4a

Shelf Life: Poor unless regularly monitored to be certain moisture is maintained as described above.

Color: Colorless

Odor: None

CAS No. 88-89-1 as Picric Acid



Plaster of Paris

see Calcium Sulfate

Platinum Wire

99.7% pure
Pt
A.W. 195.09
Supplied in one inch or multiples of one-inch lengths. If you order two inches, the piece will be two inches long, etc.

Catalog No.	B & S Gauge	Diameter (inch)	Weight (g/ft)	Price/Inch
P0145	36	.005	.083	**$ 2.05**
P0146	32	.008	.212	**3.75**
P0147	30	.010	.331	**2.70**
P0148	28	.013	.560	**5.65**
P0149	26	.016	.848	**10.15**
P0150	24	.020	1.320	**15.40**
P0151	22	.025	2.070	**21.40**

Storage: Inorganic #1

Disposal: #27a

Shelf Life: Indefinite

Color: Metallic gray

Odor: None

CAS No. 7440-06-4



Polyethylene Oxide

see Super-Duper Polymer Gel, page 360

PolySnow™

"instant snow powder"
sodium polyacrylate

NEW!

P0283	25 g	$ 5.80
P0284	100 g	11.50

Storage: Organic #3
Disposal: #26a
Shelf Life: Good, if kept dry.
Soluble: Water
Color: White
Odor: None
CAS No. 9033-79-8

D4

Polyurethane Foam System

A package which consists of two viscous liquids. When these substances are mixed, a rigid foam is produced. The volume of foam produced is 20–30 times larger than the original mixture. Liquid "A" is a polyether polyol. Liquid "B" is a polyfunctional isocyanate. Two pound set.

C0335	Set	$25.90

★ **HAZARD ALERT:** Solution "A" contains a poly ether polyol, a tertiary amine and a silicone surfactant. Provide adequate ventilation and wear protective clothing. Solution "B" contains a polyfunctional diisocyanate. Provide adequate ventilation and avoid any body contact. Wear chemical splash goggles, chemical gloves, apron and mix under a hood or with adequate ventilation.

Storage: Liquid "A" Organic #2
Liquid "B" Organic #5
Disposal: Mix, form foam then #26a.
Shelf Life: Do not store longer than three years.
Soluble: Acetone and some other organic solvents.
Color: Solution A: Yellow/amber
Solution B: Brown/amber
Odor: Solution A: Rubber-like
Solution B: None

C3



Polyurethane Foam System C0335

Polyvinyl Alcohol

laboratory grade, granular
$[CH_2CH(OH)]_n$

P0203	25 g	$ 6.95
P0153	100 g	10.05
P0154	500 g	18.90

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Off-white
Odor: None
CAS No. 9002-89-5

D3

Technical Note: If you are buying polyvinyl alcohol to prepare a polymer (like the toy "slime") also consider guar gum as a substitute. See separate catalog listing.

Polyvinyl Alcohol Solution

4%, aqueous

P0209	500 mL	$ 8.30
P0210	1 liter	14.35
P0211	4 liters	43.75

Storage: In tightly capped bottle. This substance will act as a growth media and should be kept cool.
Disposal: #26a
Shelf Life: Poor unless kept cool and uncontaminated.
Color: Cloudy
Odor: None

D3

Technical Note: Mix with saturated sodium borate solution to prepare a polymer ("slime").

Polyvinyl Alcohol/Sodium Borate "Slime Kit"

Mixing polyvinyl alcohol solution and sodium borate solution creates an interesting polymer, called "slime." Our kit provides science teachers with an opportunity to introduce themselves and their students to this polymer.

AP1829	Kit	$2.95

Provided are enough materials to make two small batches of "slime."

D3

Polyvinyl Alcohol Solution

10% aqueous, Quieting Solution

P0262	35 mL	$6.95

For hazard alert, storage, disposal, etc., see Polyvinyl Alcohol Solution, P0209.
Technical Note: Use as a quieting/slowing agent for microscopy.

D2

Look for our unique, Flinn Exclusive Quality products.

FLINN EXCLUSIVE Quality

Potash

see Potassium Carbonate

Potash, Sulfurated

liver of sulfur
sulfurated, lump

P0133	100 g	$19.85

Storage: Inorganic #5
Disposal: #23
Shelf Life: Indefinite
Soluble: Water
Color: Gray/white
Odor: Rotten eggs
CAS No. 39365-88-3

D4

Technical Note: Contains potassium polysulfides, potassium thiosulfate, and approximately 13% of sulfur as sulfide.

Authorized Personnel Only

Chemical storeroom access should only be granted to authorized science teachers. Access should be denied to students, custodians, non-science teachers, and unauthorized administrators. Keep your chemical storeroom locked!

Potassium

laboratory grade
K
A.W. 39.10

P0204 Bottle of 5 **$10.63**
small pieces for demonstration
(Packaged under mineral oil inside a PVC-coated bottle. The bottle is contained within a metal can for storage protection.)

★ **HAZARD ALERT:** Extremely *dangerous* in contact with moisture and water; releases hydrogen with sufficient heat to cause ignition or explosion; may ignite spontaneously in air or oxygen; can cause *severe* skin or eye burns. Shipped under dry oil (no water) and that is the way it **must** be stored. *Keep away from water and handle with **dry** utensils.*

★★ **SPECIAL HAZARD ALERT:** Peroxide coatings are well known to develop on the exterior surface of potassium metal. The peroxide coating consists of potassium superoxide (KO_2) and potassium peroxide (K_2O_2). Potassium superoxide is yellow and reacts explosively with the light oil in which the product is stored when the metal is cut into small pieces. Do not use any potassium that is old or yellow! **If you have a choice as to which alkali metal you use, sodium metal is a better choice since, upon aging, it does not develop peroxides.**

Storage: Inorganic #1 under dry oil in a Flinn *Saf-Stor*® Can.
Disposal: #3
Shelf Life: Poor; see Special Hazard Alert above.
Soluble: Do not attempt to place into solution.
Color: As new metal, silvery; as old metal, gray to white to off-white.
Odor: None
CAS No. 7440-09-7



Potassium Acetate

acetic acid, potassium salt
reagent grade, crystal
$KC_2H_3O_2$
F.W. 98.15

P0030 100 g **$ 9.30**
P0031 500 g **20.00**

Storage: Inorganic #2 in a Flinn *Chem-Saf*® Bag
Disposal: #26a
Shelf Life: Poor; substance deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White
Odor: Slight vinegar
CAS No. 127-08-2



Potassium Acid Phthalate

see Potassium Hydrogen Phthalate

Potassium Aluminum Sulfate

see Aluminum Potassium Sulfate

Potassium Antimonyl Tartrate

see Antimony Potassium Tartrate

An Important *"Don't"* About Potassium

If you do not know the age of your potassium metal, then *DO NOT USE IT!* It really is not worth the risk. Potassium reacts with oxygen in air to form a coating of yellow potassium superoxide (KO_2), even when the metal is stored under dry mineral oil. Old pieces of potassium are extremely dangerous. When the metal is cut, the pressure of the knife may set off a violent reaction between the superoxide coating and the metal.

Potassium Bicarbonate

potassium hydrogen carbonate
reagent grade, crystal
$KHCO_3$
F.W. 100.12

P0032 100 g **$ 7.25**
P0033 500 g **13.50**

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Poor; hygroscopic.
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 298-14-6



Potassium Binoxalate

potassium acid oxalate
laboratory grade, powder
$KHC_2O_4 \cdot \frac{1}{2}H_2O$
F.W. 136.12

P0231 25 g **$12.65**
P0232 100 g **32.10**

★ **HAZARD ALERT:** Moderately toxic by ingestion.
Storage: Inorganic #2
Disposal: #18b
Shelf Life: Poor; hygroscopic.
Soluble: Water
Color: White
Odor: None
CAS No. 127-95-7



Potassium Biphthalate

see Potassium Hydrogen Phthalate

Potassium Bisulfate

potassium hydrogen sulfate
reagent grade, crystal
$KHSO_4$
F.W. 136.17

P0134 100 g **$11.35**
P0034 500 g **22.80**

★ **HAZARD ALERT:** Slightly toxic by ingestion; severe body tissue irritant. LD_{50} 2340 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; decomposes in alcohol.
Color: White
Odor: Peanut brittle
CAS No. 7646-93-7



Potassium Bitartrate

potassium hydrogen tartrate
laboratory grade, powder
$KHC_4H_4O_6$
F.W. 188.18

P0135 100 g **$ 8.25**
P0035 500 g **17.25**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Boiling water; not alcohol.
Color: White
Odor: None
CAS No. 868-14-4



Potassium Bromate

reagent grade, crystal
$KBrO_3$
F.W. 167.02

P0205 25 g **$ 8.10**
P0136 100 g **14.51**
P0036 500 g **33.21**

★ **HAZARD ALERT:** Fire risk in contact with organic material; strong irritant; oxidizer; moderately toxic. LD_{50} 321 mg/kg.
Storage: Inorganic #6

POTASSIUM BROMATE continued on next page.

POTASSIUM BROMATE *continued*

Disposal: #12a
Shelf Life: Indefinite
Soluble: Boiling water
Color: White
Odor: Slight bromine
CAS No. 7758-01-2



Potassium Bromide

reagent grade, crystal
KBr
F.W. 119.02

P0137	100 g	**$ 6.75**
P0037	500 g	**18.10**

★ **HAZARD ALERT:** Slightly toxic by ingestion; severe body tissue irritant.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Somewhat hygroscopic; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 7758-02-3



Potassium Bromide, Gramolpak

0.1 Molar
(as KBr) *** P0244** pkg. **$5.40**

For hazard alert, storage, disposal, etc., see Potassium Bromide, P0137.
*Gramolpak® is a unique package which makes 1 liter with distilled water.





Potassium Bromide Solution

(as KBr)

0.5 Molar	**P0234**	500 mL	**$7.30**
0.1 Molar	**P0156**	500 mL	**4.45**

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Potassium Carbonate

potash, anhydrous
laboratory grade, granular
K_2CO_3
F.W. 138.21

P0038	500 g	**$10.25**

★ **HAZARD ALERT:** Slightly toxic by ingestion; body tissue irritant. LD_{50} 1870 mg/kg.
Storage: Inorganic #4
Disposal: #26a
Shelf Life: Deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 584-08-7



Potassium Carbonate

sesquihydrate
reagent grade, crystal
$K_2CO_3 \cdot 1.5H_2O$
F.W. 165.24

P0157	100 g	**$12.00**
P0158	500 g	**37.10**

★ **HAZARD ALERT:** Body tissue irritant. LD_{50} 1870 mg/kg.
Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 6381-79-9



Potassium Carbonate Solution

0.1 Molar
(as K_2CO_3) **P0159** 500 mL **$4.95**

For hazard alert, storage, disposal, etc., see Potassium Carbonate, P0157.



Potassium Chlorate

powder
$KClO_3$, F.W. 122.56

Reagent	**P0182**	100 g	**$10.51**
	P0039	500 g	**18.81**
Laboratory grade	**P0040**	500 g	**$ 7.21**
	P0041	2 kg	**28.11**

★ **HAZARD ALERT:** Strong oxidizer; slightly toxic; irritant. Extremely dangerous since the substance, if only slightly contaminated, will explode when exposed to moderate shock or when heated. Because this substance is so frequently a source of accidents on school premises we have elected to list some of the incompatible substances which should be avoided:

Ammonium Salts	Phosphorus
Carbon	Sulfuric Acid
Combustible Material	Metal Powders
Finely Divided Materials	Organic Materials
Sulfur	Sugar

★ ★ **SPECIAL HAZARD ALERT:** Only pure manganese dioxide (manganese(IV) oxide) should be used with potassium chlorate for oxygen preparation. A safer method is the catalytic decomposition of hydrogen peroxide. You will find this method recited in detail under the oxygen gas listing in this Catalog/Reference Manual.
Storage: Inorganic #6
Disposal: #12a
Shelf Life: Indefinite if stored safely.
Soluble: Boiling water
Color: White
Odor: None
CAS No. 3811-04-9



Technical Note: Potassium Chlorate as an O_2 Source: Molar volume is frequently measured by generating O_2 using potassium chlorate and manganese dioxide. Molten $KClO_3$ is a powerful oxidizer of organic materials like the rubber in the stoppers used in the generating apparatus. Explosions can and do result. We have a *Chem Fax* we will share with you about a much safer method involving the use of dry ice (solid CO_2). Write or call. We will be glad to send you a copy.

Potassium Chloride

reagent grade, crystal
KCl
F.W. 74.56

P0183	100 g	**$ 3.75**
P0042	500 g	**7.65**
P0043	2 kg	**25.60**

★ **HAZARD ALERT:** Slightly toxic by ingestion. LD_{50} 2430 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; hygroscopic.
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 7447-40-7



A Laboratory Never!

NEVER grind a strong oxidizing agent (like potassium chlorate) together with a strong reducing agent. The reaction that may result is highly exothermic. We repeat, *NEVER GRIND* potassium chlorate with anything! If mixing is required, grind the substances separately and then gently mix using a glass stirring rod.

Potassium Chloride, Gramolpak

0.1 Molar
(as KCl) * **P0246** pkg. **$5.50**

For storage, disposal, etc., see Potassium Chloride, P0183.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Potassium Chloride Solution

(as KCl)

0.5 Molar	**P0236**	500 mL	**$6.05**
0.1 Molar	**P0160**	500 mL	**6.15**

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Potassium Chromate

reagent grade, crystal
K_2CrO_4
F.W. 194.21

P0207	25 g	**$ 6.10**
P0044	100 g	**11.53**
P0045	500 g	**27.23**

★ **HAZARD ALERT:** Highly toxic; harmful to skin, eyes and respiratory tract; corrosive action on skin and mucous membranes. Chromates as a chemical family deserve special safety attention from science teachers. *Known carcinogen.* LD_{50} 180 mg/kg.

Storage: Inorganic #8 in a Flinn *Chem-Saf*® Bag and then locked up in a poisons cabinet.
Disposal: #12a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: Yellow
Odor: None
CAS No. 7789-00-6



Potassium Chromate, Gramolpak

0.1 Molar
(as K_2CrO_4) * **P0247** pkg. **$5.60**

For hazard alert, storage, disposal, etc., see Potassium Chromate, P0207.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Potassium Chromate Solution

(as K_2CrO_4)

1 Molar	**P0161**	500 mL	**$12.20**
0.5 Molar	**P0162**	500 mL	**9.85**
0.1 Molar	**P0163**	500 mL	**5.30**

★ **HAZARD ALERT:** Moderately toxic by ingestion; may be corrosive to body tissue.

Storage: Inorganic #8
Disposal: #12a
Shelf Life: Good
Color: Yellow
Odor: None



How to Neutralize a Base Spill

The common answer is to use vinegar to neutralize a base spill. Don't do it. You will have to add gallons of vinegar and this will only make the spill larger. Use anhydrous citric acid powder. It has three acid groups for neutralization, low toxicity, and is easily poured onto a spill. Keep a supply of citric acid powder on hand any time you are working with bases. See pages 916–918 for a complete listing of spill control materials.

Potassium Citrate

laboratory grade, granular
$K_3C_6H_5O_7 \cdot H_2O$
F.W. 324.35

P0109 500 g **$13.45**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Substance deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, glycerin; almost insoluble in alcohol.
Color: White
Odor: None
CAS No. 6100-05-6



Potassium Cyanide

reagent grade, granular
KCN
F.W. 65.12

P0138	25 g	**$19.13**
P0046	100 g	**27.13**

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** *Severely toxic;* poisoning may occur by ingestion; absorption through injured skin or inhalation of hydrogen cyanide (hydrogen cyanide can be liberated from the potassium cyanide by the action of carbon dioxide or acids). LD_{50} 5 mg/kg.

Storage: Inorganic #7 in a Flinn *Chem-Saf*® Bag and then locked up in a poisons cabinet.
Disposal: #14
Shelf Life: Good if stored safely. Never store this material in a naked glass bottle. Always provide an outer bag barrier in the event of breakage.
Soluble: Water, alcohol and glycerin.
Color: White
Odor: Slight almond
CAS No. 151-50-8



Safety Purchase Suggestion: Keep this material off school premises unless there is an overriding educational purpose for its use. Then store it properly as suggested above.

Potassium Dichromate

reagent grade, crystal
$K_2Cr_2O_7$
F.W. 294.22

P0047	100 g	**$ 8.93**
P0048	500 g	**22.93**
P0049	2 kg	**77.63**

★ **HAZARD ALERT:** Strong oxidant; fire risk in contact with organic material; toxic by ingestion and inhalation; corrosive to body tissue; *known carcinogen.* LD_{50} 190 mg/kg.

Storage: Inorganic #8 in a Flinn *Chem-Saf*® Bag and then locked up in a poisons cabinet.
Disposal: #12a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: Orange
Odor: None
CAS No. 7778-50-9



Potassium Dichromate, Gramolpak

0.1 Molar
(as $K_2Cr_2O_7$) * **P0248** pkg. **$5.85**

For hazard alert, storage, disposal, etc., see Potassium Dichromate, P0047.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Potassium Dichromate Solution

0.1 Molar
(as $K_2Cr_2O_7$) **P0164** 500 mL **$6.40**

★ **HAZARD ALERT:** Toxic by ingestion.

Storage: Inorganic #8
Disposal: #12a
Shelf Life: Good
Color: Orange
Odor: None



Potassium Dihydrogen Phosphate

see Potassium Phosphate, Monobasic

Potassium Ferricyanide

potassium hexacyanoferrate(III)
reagent grade, crystal

$K_3Fe(CN)_6$	P0050	100 g	$ 6.55
F.W. 329.26	P0051	500 g	19.90

★ HAZARD ALERT: If heated or in contact with concentrated acids, poisonous fumes of hydrogen cyanide gas may evolve. Compound itself has slight toxicity. LD_{50} 1600 mg/kg.

Storage: Inorganic #7 in a Flinn *Chem-Saf*® Bag.
Disposal: #14
Shelf Life: Fair, but light-sensitive.
Soluble: Water; slightly in alcohol.
Color: Orange
Odor: None
CAS No. 13746-66-2



Potassium Ferricyanide Solution

0.1 Molar

(as $K_3Fe(CN)_6$)	P0165	500 mL	$6.30

For hazard alert, storage, disposal, etc., see Potassium Ferricyanide, P0050.
Color: Yellow/green
Odor: None



Potassium Ferrocyanide

potassium hexacyanoferrate(II)
reagent grade, crystal

$K_4Fe(CN)_6 \cdot 3H_2O$	P0053	100 g	$11.85
F.W. 422.41	P0054	500 g	26.65

★ HAZARD ALERT: Dangerous if heated or if in contact with concentrated acids since hydrogen cyanide gas may evolve. Slightly toxic by ingestion. LD_{50} 3613 mg/kg.

Storage: Inorganic #7
Disposal: #14
Shelf Life: Fair to poor; effloresces on exposure to air; keep tightly capped and store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; not alcohol.
Color: Light yellow
Odor: None
CAS No. 14459-95-1



Potassium Ferrocyanide, Gramolpak

0.1 Molar

(as $K_4Fe(CN)_6 \cdot 3H_2O$)	* P0250	pkg.	$7.00

For hazard alert, storage, disposal, etc., see Potassium Ferrocyanide, P0053.
*Gramolpak® is a unique package which makes 500 mL with distilled water.



Potassium Ferrocyanide Solution

0.1 Molar

(as $K_4Fe(CN)_6 \cdot 3H_2O$)	P0220	500 mL	$6.20

For hazard alert, storage, disposal, etc., see Potassium Ferrocyanide, P0053.
Color: Light yellow
Odor: None



Potassium Fluoride

anhydrous
laboratory grade, powder

KF	P0139	100 g	$14.65
F.W. 58.10	P0055	500 g	28.50

★ HAZARD ALERT: Severe tissue irritant; toxic by ingestion and inhalation. LD_{50} 245 mg/kg.

Storage: Inorganic #2
Disposal: #6

Continued on next column.

POTASSIUM FLUORIDE *continued*

Shelf Life: Fair to poor; substance deliquescent; keep tightly capped; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, hydrofluoric acid; not alcohol.
Color: White
Odor: None
CAS No. 7789-23-3



Potassium Hexacyanoferrate(II)

see Potassium Ferrocyanide

Potassium Hexacyanoferrate(III)

see Potassium Ferricyanide

Potassium Hydrogen Carbonate

see Potassium Bicarbonate

Potassium Hydrogen Phosphate

see Potassium Phosphate, Dibasic

Potassium Hydrogen Phthalate

potassium acid phthalate
reagent grade, crystal
99.95–100.05% minimum

$KHC_8H_4O_4$	P0056	100 g	$11.55
F.W. 204.23	P0057	500 g	25.30

Storage: Inorganic #2
Disposal: #24a
Shelf Life: Indefinite
Soluble: Water
Color: White
Odor: None
CAS No. 877-24-7



Technical Note: Primary standard for preparing volumetric alkali solutions. Also used as a buffering agent.

Potassium Hydrogen Phthalate, Gramolpak

0.1 Molar

(as $KHC_8H_4O_4$)	* P0251	pkg.	$4.90

For storage, disposal, etc., see Potassium Hydrogen Phthalate, P0056.
*Gramolpak® is a unique package which makes 1 liter with distilled water.



Potassium Hydrogen Phthalate Solution

0.1 Molar

(as $KHC_8H_4O_4$)	P0221	500 mL	$7.45

For storage, disposal, etc., see Potassium Hydrogen Phthalate, P0056.
Color: Colorless
Odor: None



Potassium Hydrogen Sulfate

see Potassium Bisulfate

Potassium Hydrogen Tartrate

see Potassium Bitartrate

Laboratory Headache

A headache acquired in a laboratory may be nature's way of alerting you to the presence of toxic vapors. A laboratory can become saturated with toxic vapors which are not always evident by an odor. When you or a student complains of a headache, it may well be time to throw open the lab windows, take yourself and your students to a source of fresh air, and allow the lab air to be thoroughly exchanged.

Potassium Hydroxide

KOH
F.W. 56.11

Reagent	**P0058**	100 g	**$ 6.31**
pellet	**P0059**	500 g	**12.71**
	P0060	2 kg	**41.21**
Laboratory grade	**P0061**	500 g	**$ 6.41**
flake	**P0062**	2 kg	**21.71**

★ **HAZARD ALERT:** Skin contact causes severe blisters; strongly corrosive as a solid and as a solution; very harmful if swallowed; extremely dangerous to eyes. LD_{50} 273 mg/kg. TLV 2 mg/m^3.

★★ **SPECIAL HAZARD ALERT:** Wear appropriate face and body protection when making solutions; potassium hydroxide generates large amounts of heat while dissolving. You might consider immersing your solution-making vessel in an ice bath. The ice bath will better enable you to control the solution temperature. Stir continuously. See page 155.

Storage: Inorganic #4
Disposal: #10
Shelf Life: Fair; absorbs water and carbon dioxide.
Soluble: Water, alcohol and glycerin.
Color: White
Odor: None
CAS No. 1310-58-3



Technical Note: Reagent potassium hydroxide contains 10–15% water.



Potassium Hydroxide, Gramolpak

(as KOH)

3 Molar	* **P0252**	pkg. (Makes 250 mL)	**$10.75**
1 Molar	* **P0253**	pkg. (Makes 500 mL)	**5.20**

For hazard alert, storage, disposal, etc., see Potassium Hydroxide, P0058.

*Gramolpak® is a unique package which makes a known solution with distilled water.





Potassium Hydroxide Solution

(as KOH)

0.2 Molar	**P0166**	500 mL	**$4.20**
0.1 Molar	**P0167**	500 mL	**4.60**

★ **HAZARD ALERT:** Slightly corrosive liquid.
Storage: Inorganic #4
Disposal: #10
Shelf Life: Good
Color: Colorless
Odor: None



Preparing an Iodine Solution?

Iodine crystals are not directly soluble in water, which is why most water-based iodine solutions call for potassium iodide as an ingredient. Iodine is soluble in potassium iodide solutions. As a general rule, start with approximately one-fourth of the final volume of water and add the required amount of potassium iodide. Once the potassium iodide has dissolved, add the iodine crystals. Stir until completely dissolved and bring the solution up to its final volume. Iodine solutions should be prepared under a fume hood.

Potassium Iodate

powder
KIO_3
F.W. 214.01

Reagent	**P0063**	25 g	**$ 5.65**
	P0064	100 g	**16.81**
	P0065	500 g	**49.91**
Laboratory grade	**P0277**	100 g	**$13.91**

★ **HAZARD ALERT:** Oxidizer; moderately toxic; tissue irritant. LD_{50} 531 mg/kg.
Storage: Inorganic #6
Disposal: #12a
Shelf Life: Indefinite
Soluble: Water; dilute sulfuric acid; not alcohol.
Color: White
Odor: Strong iodine
CAS No. 7758-05-6



Potassium Iodate, Gramolpak

0.1 Molar
(as KIO_3) * **P0254** pkg. **$6.80**

For hazard alert, storage, disposal, etc., see Potassium Iodate, P0063.

*Dissolve Gramolpak® in distilled water containing 5 mL of concentrated sulfuric acid (Flinn No. S0228); dilute to 1 liter with distilled water. Always add acid to water.





Potassium Iodate Solution

Saturated
(as KIO_3) **P0237** 100 mL **$10.25**

Storage: Inorganic #6
Disposal: #12a
Shelf Life: Indefinite
Color: Colorless
Odor: Slight iodine



Potassium Iodate Solution

(as KIO_3)

0.2 Molar	**P0168**	500 mL	**$7.15**
0.1 Molar	**P0169**	500 mL	**5.90**

For storage, disposal, etc., see Potassium Iodate Solution, P0237.
Color: Colorless
Odor: None



Potassium Iodide

crystal
KI
F.W. 166.01

Reagent	**P0066**	25 g	**$ 7.60**
	P0067	100 g	**13.95**
	P0184	500 g	**43.50**
	P0068	2 kg	**166.95**
Laboratory grade	**P0278**	100 g	**$ 12.00**
	P0279	500 g	**29.95**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; moisture- and light-sensitive.
Soluble: Water, alcohol, acetone and glycerin.
Color: White
Odor: None
CAS No. 7681-11-0



Potassium Iodide, Gramolpak

0.1 Molar
(as KI) * **P0255** pkg. **$4.85**

For storage, disposal, etc., see Potassium Iodide, P0066.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Potassium Iodide Solution

(as KI)

1 Molar	**P0170**	500 mL	**$14.10**
0.5 Molar	**P0171**	500 mL	**10.80**
0.2 Molar	**I0026**	500 mL	**10.30**
0.1 Molar	**P0172**	500 mL	**8.15**

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite; however, the 0.1 M KI will grow mold.
Color: Colorless, but darkens on exposure to light.
Odor: Slight iodine



See page 37 for a detailed explanation of the Flinn Hazard and Usefulness Code.



Potassium meta-Periodate

see Potassium Periodate

Potassium Nitrate

saltpeter
KNO_3
F.W. 101.11

Reagent	**P0070**	100 g	**$ 7.95**
crystal	**P0071**	500 g	**14.30**
	P0072	2 kg	**57.95**
Laboratory grade	**P0073**	500 g	**$ 5.20**
granular	**P0074**	2 kg	**17.85**

★ **HAZARD ALERT:** Strong oxidant; fire and explosion risk when heated or in contact with organic material; skin irritant. LD_{50} 3750 mg/kg.
Storage: Inorganic #3
Disposal: #26a
Shelf Life: Good; slightly hygroscopic; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, glycerin, slightly in alcohol.
Color: White
Odor: None
CAS No. 7757-79-1



Potassium Nitrate, Gramolpak

0.1 Molar
(as KNO_3) * **P0256** pkg. **$4.75**

For hazard alert, storage, disposal, etc., see Potassium Nitrate, P0070.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Potassium Nitrate Solution

(as KNO_3)

0.5 Molar	**P0173**	500 mL	**$7.60**
0.1 Molar	**P0174**	500 mL	**5.40**

Storage: Inorganic #3
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Potassium Nitrite

crystal
KNO_2
F.W. 85.11

Reagent	**P0140**	25 g	**$12.50**
	P0108	100 g	**21.51**
Laboratory grade	**P0280**	100 g	**$19.41**

★ **HAZARD ALERT:** Strong oxidant; fire and explosion risk when heated or in contact with organic material; skin irritant; highly toxic. LD_{50} 200 mg/kg.
Storage: Inorganic #3
Disposal: #12b
Shelf Life: Fair; hygroscopic; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; not alcohol.
Color: Very light yellow
Odor: None
CAS No. 7758-09-0



Potassium Nitrite Solution

1 Molar
(as KNO_2) **P0238** 100 mL **$8.05**

★ **HAZARD ALERT:** Strong oxidant; skin irritant; toxic.
Storage: Inorganic #3
Disposal: #12b
Shelf Life: Indefinite
Color: Very light yellow
Odor: None



Potassium Oxalate

laboratory grade, crystal
$K_2C_2O_4 \cdot H_2O$ **P0198** 100 g **$ 8.95**
F.W. 184.24 **P0075** 500 g **18.00**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Efflorescent in warm, dry air; keep tightly capped; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: Off-white
Odor: None
CAS No. 6487-48-5



Potassium Periodate

potassium meta-periodate
laboratory grade, crystal
KIO_4 **P0208** 10 g **$13.20**
F.W. 230.01 **P0076** 25 g **22.55**

★ **HAZARD ALERT:** Strong oxidant, fire risk in contact with organic material; severe skin irritant.
Storage: Inorganic #6
Disposal: #12a
Shelf Life: Indefinite
Soluble: Slightly in water.
Color: White
Odor: None
CAS No. 7790-21-8



Alkalies and Eyes

The most common alkalies on school premises are sodium hydroxide and potassium hydroxide. Even weak solutions react with (saponify) or attack body fat and skin. The skin feels soapy but there is no sensation of burning. The underlying nerves are destroyed or altered so that no sensation of pain occurs. Alkalies are more subtly dangerous to the eyes than acids in this regard. A victim will simply not realize the damage done. When you see the warning: "strong alkali" the goggles go on. If you use chemicals—wear goggles.

Potassium Permanganate

reagent grade, crystal

$KMnO_4$	P0077	100 g	$ 6.40
F.W. 158.04	P0078	500 g	12.75
	P0079	2 kg	49.21

★ **HAZARD ALERT:** Powerful oxidizing agent; can explode on sudden heating; common cause of eye accidents; *wear face protection.* Strong skin irritant; slightly toxic by ingestion. LD_{50} 1090 mg/kg.

Storage: Inorganic #8
Disposal: #12a
Shelf Life: Indefinite
Soluble: Water, alcohol and methyl alcohol; decomposes in water.
Color: Gray/black
Odor: None
CAS No. 7722-64-7



Potassium Permanganate, Gramolpak

0.1 Molar

(as $KMnO_4$)	* P0257	pkg.	$5.60

For hazard alert, storage, disposal, etc., see Potassium Permanganate, P0077.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Potassium Permanganate Solution

(as $KMnO_4$)

0.2 Molar	P0239	500 mL	$5.80
0.1 Molar	P0175	500 mL	6.00
0.01 Molar	P0176	500 mL	4.75

★ **HAZARD ALERT:** Solution may be a skin irritant.

Storage: Inorganic #8
Disposal: #12a
Shelf Life: Fair to poor.
Color: Purple/black
Odor: None



Potassium Persulfate

laboratory grade, crystal

$K_2S_2O_8$	P0199	100 g	$ 7.91
F.W. 270.33	P0080	500 g	17.21

★ **HAZARD ALERT:** Strong oxidant; skin irritant; solid and solution readily liberate oxygen on heating; fire risk with organic material; moderately toxic. LD_{50} 802 mg/kg.

Storage: Inorganic #6
Disposal: #12a
Shelf Life: Fair to poor.
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 7727-21-1



Potassium Permanganate— An O_2 Source

Potassium permanganate could be a convenient O_2 source for small scale collection. Heat the substance in a test tube. The rate of O_2 release should be easy to collect. The method is safe, using no chlorates or liquids like H_2O_2. The student can, in addition, observe two oxidation states of manganese. The green material that appears when the test tube is washed is aqueous manganate ion. The solid brown residue is manganese dioxide.

Potassium Phosphate, Monobasic

reagent grade, crystal

KH_2PO_4	P0141	100 g	$10.35
F.W. 136.09	P0081	500 g	21.10

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; hygroscopic.
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 7778-77-0



Potassium Phosphate, Dibasic

reagent grade, powder

K_2HPO_4	P0142	100 g	$ 8.55
F.W. 174.18	P0082	500 g	28.15

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor unless stored under dry conditions; hygroscopic; keep tightly capped; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: White
Odor: None
CAS No. 7758-11-4



Potassium Phosphate (Dibasic) Solution

0.1 Molar

(as K_2HPO_4)	P0223	500 mL	$6.50

For storage, disposal, etc., see Potassium Phosphate, P0142.
Color: Colorless
Odor: None



Potassium Phosphate, Tribasic

reagent grade, powder

$K_3PO_4 \cdot nH_2O$	P0143	25 g	$ 8.40
F.W. 212.27	P0083	100 g	23.05
(as K_3PO_4)			

★ **HAZARD ALERT:** Slightly toxic; severe body tissue irritant. LD_{50} 1450 mg/kg.

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor unless stored under dry conditions; hygroscopic; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water—giving a strongly basic solution; insoluble in alcohol.
Color: White
Odor: None
CAS No. 7778-53-2



Potassium Phosphate (Tribasic) Solution

0.1 Molar

(as K_3PO_4)	P0177	500 mL	$7.75

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Potassium Sodium Tartrate

Rochelle salt
reagent grade, crystal

$KNaC_4H_4O_6 \cdot 4H_2O$	P0084	100 g	$ 7.45
F.W. 282.23	P0085	500 g	16.90

Storage: Inorganic #2
Disposal: #26a

POTASSIUM SODIUM TARTRATE continued on next page.

POTASSIUM SODIUM TARTRATE *continued*

Shelf Life: Fair to poor; efflorescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 6381-59-5



Potassium Sodium Tartrate, Gramolpak

1 Molar
(as $KNaC_4H_4O_6 \cdot 4H_2O$) * **P0240** pkg. **$5.40**

For storage, disposal, etc., see Potassium Sodium Tartrate, P0084.
*Gramolpak® is a unique package which makes 100 mL with distilled water.



Potassium Sulfate

K_2SO_4
F.W. 174.27

Reagent	**P0144**	100 g	**$ 7.95**
crystal	**P0086**	500 g	**16.65**
Laboratory grade	**P0087**	100 g	**$ 7.55**
powder	**P0088**	500 g	**13.10**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 7778-80-5



Potassium Sulfate, Gramolpak

0.1 Molar
(as K_2SO_4) * **P0258** pkg. **$5.10**

For storage, disposal, etc., see Potassium Sulfate, P0144.
*Gramolpak® is a unique package which makes 1 liter with distilled water.



Potassium Sulfate Solution

(as K_2SO_4)

0.5 Molar	**P0241**	500 mL	**$7.05**
0.1 Molar	**P0224**	500 mL	**4.60**

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: None



Potassium Thiocyanate

crystal
KSCN
F.W. 97.18

Reagent	**P0225**	50 g	**$ 7.60**
	P0089	100 g	**10.95**
	P0090	500 g	**26.95**
Laboratory grade	**P0281**	100 g	**$ 8.85**

★ **HAZARD ALERT:** Moderately toxic by ingestion; emits toxic fumes of cyanide if strongly heated or in contact with concentrated acids. Decomposes to NO and HCN in the presence of dilute nitric acid. LD_{50} 854 mg/kg.
Storage: Inorganic #7
Disposal: #26a
Shelf Life: Substance deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, alcohol and acetone.
Color: White
Odor: None
CAS No. 333-20-0



Potassium Thiocyanate, Gramolpak

0.1 Molar
(as KSCN) * **P0259** pkg. **$6.75**

For hazard alert, storage, disposal, etc., see Potassium Thiocyanate, P0225.
*Gramolpak® is a unique package which makes 1 liter with distilled water.

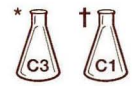


Potassium Thiocyanate Solution

(as KSCN)

1 Molar*	**P0226**	500 mL	**$7.55**
0.5 Molar*	**P0227**	500 mL	**5.85**
0.1 Molar†	**P0178**	500 mL	**5.90**

For hazard alert, storage, disposal, etc., see Potassium Thiocyanate, P0225.
Color: Colorless
Odor: None



Potato Dextrose Agar

bacteriological media

	P0098	100 g	**$33.55**
	P0099	500 g	**89.25**

Storage: Miscellaneous, non-hazardous organic material.
Disposal: #26a
Shelf Life: Good if kept dry.
Soluble: Water
Color: Buff
Odor: Sour mash



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Potato Starch

see Starch, Potato

Praseodymium Chloride Solution

includes 50-mL square plastic bottle for spectroscopy experiments
0.2 Molar
(as $PrCl_3 \cdot 7H_2O$) **P0269** 50 mL **$11.20**

★ **HAZARD ALERT:** Slightly toxic by ingestion. Body tissue irritant.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Soluble: Water
Color: Light green
Odor: None
CAS No. 10361-79-2



Technical Note: Great solution for teaching absorption spectroscopy. Green color provides a good line spectrum.

Propane

see Burner, Propane on page 209

The 5¢ Protectors

Disposable polyethylene gloves cost about 2½¢ each. A pair will cost you about a nickel. Phenol is an example of a substance that demands the 5¢ protectors. Throw-away gloves provide a cheap barrier between you and trouble. Yes, such gloves are slightly cumbersome and yes, you must take a few minutes to locate the gloves and put them on. How could you regret wearing these 5¢ protectors?

1,2-Propanediol

propylene glycol
$CH_3CHOHCH_2OH$ F.W. 76.10

P0200	100 mL	$11.30
P0128	500 mL	32.40

Storage: Organic #2
Disposal: #18b
Shelf Life: Hygroscopic; keep tightly capped; store in a Flinn *Chem-Saf*® Bag.
Soluble: Miscible with water, alcohol and many organic solvents.
Color: Colorless
Odor: None
CAS No. 57-55-6



1-Propanol

see n-Propyl Alcohol under Propyl

2-Propanol

see Isopropyl Alcohol

Propionic Acid

propanoic acid, mold inhibitor
laboratory grade
CH_3CH_2COOH F.W. 74.08

P0187	100 mL	$ 5.60
P0091	500 mL	11.01

★ **HAZARD ALERT:** Flammable liquid; flash point 54 °C (130 °F); liquid burns skin and eyes. LD_{50} 2600 mg/kg. TLV 30 mg/m^3.
Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Water, alcohol and chloroform.
Color: Clear
Odor: Rancid; vinegar-like.
CAS No. 79-09-4



Technical Note: Add 1 mL per liter of culture media for mold inhibition.

n-Propyl Alcohol

1-propanol
reagent grade
$CH_3CH_2CH_2OH$ F.W. 60.10

P0228	100 mL	$5.60
P0092	500 mL	9.40

★ **HAZARD ALERT:** Flammable liquid; dangerous fire risk; harmful to eyes and respiratory tract. LD_{50} 1870 mg/kg. TLV 492 mg/m^3.
Storage: Organic #2 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Indefinite if stored safely.
Soluble: Water and alcohol
Color: Colorless
Odor: Alcohol
CAS No. 71-23-8



Propylene Glycol

see 1,2-Propanediol

PTC

see Phenyl Thiocarbamide

Thermometers and Ovens

Over and over again, we stress the subtle and cumulative toxic nature of mercury. Most ovens we examine on our inspections have mercury-filled thermometers mounted in the top of the oven in the provided thermometer well. A hot oven will quickly vaporize a great deal of the mercury from a broken oven thermometer. Science teachers should immediately remove mercury thermometers from lab ovens and substitute non-mercury thermometers. Review our non-mercury thermometer listings on pages 305–306.

Pumice

silicates of aluminum, potassium and sodium
powder

P0093	500 g	$22.80

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Insoluble in water and acids.
Color: Light gray/white
Odor: None



Pyridine

reagent grade
C_5H_5N F.W. 79.10

P0229	50 mL	$12.01
P0094	100 mL	18.21

★ **HAZARD ALERT:** Flammable liquid (flash point 20 °C/68 °F); harmful to skin and eyes; avoid prolonged exposure; toxic by ingestion, inhalation, and skin absorption. LD_{50} 891 mg/kg. TLV 16 mg/m^3.
Storage: Organic #2 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #5
Shelf Life: Good if stored safely.
Soluble: Water, alcohol and other organic solvents.
Color: Colorless
Odor: Unique and entirely disagreeable.
CAS No. 110-86-1



Pyrogallol

pyrogallic acid
laboratory grade, crystal
C_6H_3-1,2,3-$(OH)_3$ F.W. 126.11

P0206	10 g	$ 8.00
P0095	25 g	19.05
P0096	100 g	35.75

★ **HAZARD ALERT:** Toxic; readily absorbed through the skin; harmful to eyes and lungs. Stains skin. LD_{50} 300 mg/kg.
Storage: Organic #8 in a Flinn *Chem-Saf*® Bag and then locked up in a poisons cabinet.
Disposal: #18b
Shelf Life: Indefinite; crystals turn gray on exposure to light.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 87-66-1



Q

Quicklime

see Calcium Oxide

Quicksilver

see Mercury, Metal

Quinine Sulfate

laboratory grade, powder
$(C_{20}H_{24}N_2O_2)_2 \bullet H_2SO_4 \bullet 2H_2O$ F.W. 782.97

Q0029	1 g	$ 6.95
Q0019	5 g	20.05

★ **HAZARD ALERT:** Skin irritant; moderately toxic by ingestion.
Storage: Organic #2
Disposal: #5
Shelf Life: Indefinite; light-sensitive.
Soluble: Slightly in water and many common organic solvents.
Color: White
Odor: None
CAS No. 6119-70-6



Quieting Solution

see Polyvinyl Alcohol, 10% or Methyl Cellulose, 3%

R

Red Lead
see Lead Oxide, Tetra

Rennin
rennet powder — R0011, 10 g, $21.55; R0001, 25 g, 33.90

Storage: Miscellaneous non-hazardous organic material.
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Off-white
Odor: Sour mash
CAS No. 9001-98-3



Resazurin
biological stain/indicator
pH 3.8 orange to 6.5 violet
$C_{12}H_6NO_4Na$
F.W. 251.18
R0012, 1 g, $16.70

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Slightly in water; soluble in dilute alkali.
Color: Gray
Odor: None
CAS No. 62758-13-8



Resazurin Solution
1%, aqueous — * R0013, 20 mL, $7.50

For storage, disposal, etc., see Resazurin, R0012.
Color: Blue/black
Odor: None



*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Resin, Ion Exchange
see Ion Exchange Resin

Resorcinol
laboratory grade, crystal
meta-$C_6H_4(OH)_2$
F.W. 110.11
R0015, 25 g, $ 8.40; R0002, 100 g, 16.63

★ HAZARD ALERT: Toxic; readily absorbed through skin; skin and eye irritant. LD_{50} 301 mg/kg. TLV 45 mg/m^3.
Storage: Organic #8
Disposal: #18b
Shelf Life: Indefinite
Soluble: Water and many organic solvents.
Color: White
Odor: Floral
CAS No. 108-46-3



Rhodamine B
basic violet 10
biological stain
$C_{28}H_{31}ClN_2O_3$
F.W. 479.00
R0008, 25 g, $31.80

★ HAZARD ALERT: Moderately toxic. LD_{50} 887 mg/kg.
Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Green
Odor: None
CAS No. 81-88-9
C.I. #45170



Rhodamine B Staining Solution
1%, aqueous — * R0014, 20 mL, $9.25

For storage, disposal, etc. see Rhodamine B, R0008.
Color: Purple
Odor: None



*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Ribonucleic Acid
ribose nucleic acid, RNA
from yeast — N0018, 25 g, $55.35

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 63231-63-0



Ringer's Solution
isotonic solution
For frogs — R0003, 500 mL, $5.45
For mammals — R0006, 500 mL, 6.30

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: None



Technical Note: Saline solution used for frog or mammal physiology experiments.

RNA
see Ribonucleic Acid

Rochelle Salt
see Potassium Sodium Tartrate

Rose's Alloy
see Onion's Fusible Alloy as an alternative to Rose's Alloy

Rose Bengal
acid red 94
biological stain
$C_{20}H_2Cl_4I_4K_2O_5$
F.W. 1049.84
R0009, 5 g, $27.50

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Rose
Odor: None
CAS No. 632-69-9
C.I. #45440



Rubbing Alcohol
see Isopropyl Alcohol, 70%

What Does LD_{50} Mean?

LD_{50} (lethal dose, 50% kill), is the dose which, when administered to test animals, kills half of them. The LD_{50} is expressed in milligrams (mg) of substance per kilogram (kg) of animal body mass and the method by which the toxicant was administered, e.g., oral, intravenous, etc., but not via inhalation. For more information, review the article on toxicity on pages 930–931.

S

Sabouraud Dextrose Agar
culture media

S0337 100 g $18.85

Storage: Miscellaneous non-hazardous organic materials.
Disposal: #26a
Shelf Life: Fair, if kept dry.
Soluble: Water
Color: Buff
Odor: Sour malt



Sabouraud Dextrose Broth
dehydrated powder

S0444 100 g $29.25

Storage: Miscellaneous non-hazardous organic materials.
Disposal: #26a
Shelf Life: Fair, if kept dry.
Soluble: Water
Color: Buff
Odor: Sour malt
Technical Note: Prepare broth by dissolving 30 g powder in 1 liter DI water, then sterilize.



Safranin O
biological stain S0339 10 g $15.00

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Deep rose/purple
Odor: None
CAS No. 477-73-6
C.I. #50240



Safranin Staining Solution
1%, aqueous

S0178 500 mL $21.75

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Red
Odor: None



Safranin Staining Solution
Gram counter stain
0.25%, alcoholic S0340 100 mL $ 8.15
S0169 500 mL 11.95

★ **HAZARD ALERT:** 40% alcohol based solution; vapors may be flammable.
Storage: Organic #9
Disposal: #18b
Shelf Life: Indefinite if stored safely.
Color: Red
Odor: Alcohol



Dry Sand—
A Chemist's Good Friend

Dry sand is a good fire extinguisher, especially for use with flammable solids like sodium. Dry, clean sand also can be used to dike and absorb a hazardous material spill. Sand provides necessary traction in a treacherous floor situation. See to it that dry, clean sand is available in your laboratory and chemical storeroom.

Sal Ammoniac
see Ammonium Chloride

Salicylic Acid
laboratory grade, crystal
$2\text{-}HOC_6H_4COOH$ S0341 50 g $ 4.85
F.W. 138.13 S0001 100 g 6.45
S0002 500 g 16.45

★ **HAZARD ALERT:** Moderately toxic by ingestion; LD_{50} 891 mg/kg.
Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Slightly in water; many organic solvents.
Color: White
Odor: None
CAS No. 69-72-7



Saline Solution
see Ringer's Solution

Saltpeter
see Potassium Nitrate

Sand
fine, white S0003 500 g $4.00
S0004 2 kg 7.10

Storage: Miscellaneous non-hazardous inorganic material.
Color: White/gray
Odor: None
CAS No. 14808-60-7



Sandpaper
fine
9″ × 11″ sheets S0165 pkg./4 $6.45

Storage: Miscellaneous non-hazardous inorganic material.



Schaeffer's Salt
see 2-Naphthol-6-Sulfonic Acid, Sodium Salt

Schiff Reagent
test for aldehydes
contains: basic fuchsin, sodium metabisulfite, hydrochloric acid, and water

S0180 100 mL $14.80
(Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Body tissue irritant.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: Strong rotten eggs



Sebacoyl Chloride
sebacyl chloride
laboratory grade S0284 25 mL $39.55
$COCl(CH_2)_8COCl$ S0163 100 mL 91.45
F.W. 239.14
(Both package sizes packaged in wax sealed, PVC-coated bottles)

★ **HAZARD ALERT:** Corrosive; fumes strongly irritating to eyes; toxic by ingestion and inhalation.
Storage: Organic #1
Disposal: #1a
Shelf Life: Poor
Soluble: Hydrocarbons and ether; decomposes slowly in water.
Color: Colorless
Odor: Suffocating acid
CAS No. 111-19-3



Sebacoyl Chloride/Hexane Solution

4 mL of sebacoyl chloride in 100 mL of hexane for nylon polymer experiment or demonstration

S0260	100 mL	$12.95

★ HAZARD ALERT: Flammable liquid; dangerous fire risk.
Storage: Organic #3 in a dedicated flammables cabinet.
Disposal: #18b
Shelf Life: Indefinite
Color: Colorless
Odor: Suffocating acid


Technical Note: To prepare nylon you will need a second solution, hexamethylene diamine/sodium hydroxide solution (see page 97). Also see the nylon demonstration kit on page 361.

Sesame Oil

S0264	100 mL	$11.05

Storage: Organic #3
Disposal: #26a
Shelf Life: Indefinite
Soluble: Alcohol
Color: Amber
Odor: None
CAS No. 8008-74-0


Silica Gel

6–20 mesh
blue, indicating general purpose

S0212	100 g	$ 7.30
S0008	500 g	17.95

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Good if kept dry.
Soluble: Generally insoluble
Color: Blue
Odor: None
CAS No. 7631-86-9


Technical Note: Silica gel turns from dark blue to a light pink when wet. It can be regenerated upon heating.

Silica Gel

for chromatography

35–60 Mesh	S0407	50 g	$12.95
	S0408	100 g	19.60
100–200 Mesh	S0411	50 g	$14.60
	S0412	100 g	21.80
200–425 Mesh	S0409	50 g	$14.60
	S0410	100 g	21.95

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Good if kept dry.
Soluble: Generally insoluble
Color: White
Odor: None
CAS No. 7631-86-9


Technical Note: As mesh size goes up, particle size decreases e.g., 200 mesh are finer particles than 35 mesh.

Silicon

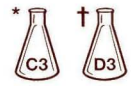
laboratory grade
Si
A.W. 28.09

Powder*	S0012	500 g	$19.93
Lumps†	S0342	100 g	$ 6.55
	S0013	500 g	14.35

★ HAZARD ALERT: Flammable in powder form. LD_{50} 3160 mg/kg. TLV 10 mg/m^3.
Storage: Inorganic #1
Disposal: #26a

Continued on next column.

SILICON *continued*

Shelf Life: Indefinite
Soluble: Mixture of nitric and hydrofluoric acid and alkalies.
Color: Gray
Odor: None
CAS No. 7440-21-3


Silver, Foil

0.005″ × 2″	S0270	5 g	$21.55
reagent grade, Ag	S0014	10 g	40.00
A.W. 107.87	S0015	25 g	70.00

Storage: Inorganic #1
Disposal: #27a
Shelf Life: Indefinite
Soluble: Nitric and hot sulfuric acids.
Color: Silver
Odor: None
CAS No. 7440-22-4


Silver, Shot

reagent grade

S0271	5 g	$24.95
S0016	10 g	44.40

For storage, disposal, etc., see Silver, Foil, S0270.


Silver Acetate

reagent grade, powder
CH_3CO_2Ag
F.W. 166.93

S0018	10 g	$ 15.40
S0019	25 g	33.70
S0020	100 g	126.25

(All above package sizes packaged in PVC-coated bottles)

Storage: Inorganic #2
Disposal: #11
Shelf Life: Indefinite but light-sensitive.
Soluble: Hot water and nitric acid
Color: Brown/gray/white
Odor: Slight vinegar
CAS No. 563-63-3


Silver Chloride

reagent grade, powder
AgCl
F.W. 143.34

S0272	5 g	$ 14.20
S0021	10 g	22.65
S0273	25 g	39.10
S0023	100 g	137.85

(All above package sizes packaged in PVC-coated bottles)

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite but light-sensitive.
Soluble: Very slightly in water; ammonium hydroxide; concentrated sulfuric acid; sodium thiosulfate and potassium bromide solution.
Color: Brown/gray/white
Odor: Slight chlorine
CAS No. 7783-90-6


The "I'll Do This Just Once" Syndrome

The "I will do this just once" syndrome has gotten many science teachers into serious trouble. You are working alone in the prep area. You are about to do something involving a hazardous process and you know it is poor practice. STOP—do not take chances. There is nothing so important that you would want to risk your well-being. Science teachers have a special responsibility to themselves and their students to abandon the "I'll do this just once" attitude.

Silver Nitrate

crystal
$AgNO_3$
F.W. 169.87

Reagent	**S0274**	5 g	**$ 8.25**
	S0025	25 g	**23.40**
	S0026	100 g	**82.91**
	S0027	500 g	**306.01**
Laboratory grade	**S0433**	25 g	**$ 19.95**
	S0434	100 g	**78.91**

★ **HAZARD ALERT:** Corrosive solid; causes burns; avoid contact with eyes and skin; will stain skin and clothing; highly toxic. LD_{50} 50 mg/kg.

Storage: Inorganic #3 in a Flinn *Chem-Saf*® Bag and then in a locked poisons cabinet.

Disposal: #11

Shelf Life: Indefinite but light-sensitive.

Soluble: Water; hot alcohol.

Color: White

Odor: Faint nitric acid

CAS No. 7761-88-8

Technical Note: Forms permanent brown/black stains on skin.



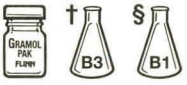
Silver Nitrate, Gramolpak

(as $AgNO_3$)

1 Molar†	* **S0382**	pkg.	**$17.40**
0.1 Molar§	* **S0405**	pkg.	**8.35**

For hazard alert, storage, disposal, etc., see Silver Nitrate, S0274.

*Gramolpak® is a unique package which makes 100 mL with distilled water.





Silver Nitrate Solution

(as $AgNO_3$)

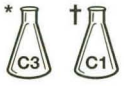
1 Molar*	**S0304**	25 mL	**$11.65**
	S0171	100 mL	**18.95**
	S0172	500 mL	**88.90**
0.5 Molar*	**S0261**	100 mL	**$15.65**
	S0262	500 mL	**42.80**
0.2 Molar*	**S0263**	100 mL	**$12.25**
	S0265	500 mL	**23.90**
0.1 Molar†	**S0305**	100 mL	**$10.50**
	S0147	500 mL	**18.45**

(All above package sizes and concentrations packaged in PVC-coated bottles)

For hazard alert, storage, disposal, etc., see Silver Nitrate, S0274.

Color: Colorless

Odor: None



Avoid Interchanging Dropping Pipets

You have placed a bottle or bottles of solution(s) in a central location. Students are asked to dispense a few drops. Tape a test tube to the side of the bottle. The test tube can be the receptacle to hold the pipet for that particular reagent. This inexpensive idea is simple, safe, leads to less dripping and spillage, and reduces pipet mix-up.

Problem with Silver Nitrate Stains?

Silver nitrate stains on clothing can almost always be removed by the use of Spray 'N Wash®, which is obtainable in the laundry products section of your local grocery store. Silver nitrate stains on skin cannot be removed; wear gloves.

Silver Oxide

laboratory grade, powder
Ag_2O
F.W. 231.76

S0275	5 g	**$12.65**
S0028	10 g	**18.60**
S0029	25 g	**34.90**

★ **HAZARD ALERT:** Slightly toxic; fire risk in contact with organic material or ammonia. LD_{50} 2820 mg/kg.

Storage: Inorganic #4

Disposal: #26a

Shelf Life: Indefinite but light-sensitive.

Soluble: Ammonium hydroxide, nitric acid, sodium thiosulfate solution; slightly in water; insoluble in alcohol.

Color: Gray/black

Odor: None

CAS No. 20667-12-3



Technical Note: See Flinn disposal procedure #11 on pages 986–987 for an inexpensive route to prepare silver oxide from silver wastes.

Silver Sulfate

reagent grade, powder
Ag_2SO_4
F.W. 311.83

S0276	5 g	**$10.80**
S0030	10 g	**15.90**
S0031	25 g	**34.80**

(All above package sizes packaged in PVC-coated bottles)

Storage: Inorganic #2

Disposal: #26a

Shelf Life: Indefinite but light-sensitive.

Soluble: Ammonium hydroxide, nitric acid, sulfuric acid, hot water; not alcohol.

Color: White

Odor: None

CAS No. 10294-26-5



Slaked Lime

see Calcium Hydroxide

Soap

see other cleaning substances under the heading: Cleaners

Soap, Castile

powder	**S0032**	500 g	**$10.85**

Storage: Miscellaneous non-hazardous organic material.

Disposal: #26a

Shelf Life: Indefinite

Soluble: Water

Color: Yellow

Odor: Soap



Soap, Ivory

Ivory® Snow detergent	**S0266**	1.6 lb. box	**$10.15**

Storage: Miscellaneous non-hazardous organic material.

Disposal: #26a

Shelf Life: Indefinite

Soluble: Water

Color: White

Odor: Soap



Soap Solution, Tincture

standard, in denatured alcohol
1 mL = 1 mg calcium carbonate

S0343	100 mL	$ 6.20
S0156	500 mL	12.85

★ HAZARD ALERT: Contains ethyl alcohol; moderately toxic by ingestion and inhalation.
Storage: Organic #2 in a dedicated flammables cabinet.
Disposal: #26b
Shelf Life: Indefinite
Soluble: Water
Color: Cloudy white
Odor: Alcohol



Soda Ash

see Sodium Carbonate Anhydrous

Soda Lime

laboratory grade	S0306	100 g	$ 9.90
4–8 mesh granules	S0033	500 g	26.00

★ HAZARD ALERT: Soda lime is a corrosive solid—skin burns are possible; much heat is evolved when added to water; very dangerous to eyes. LD_{50} 3530 mg/kg.
Storage: Inorganic #4. Must be stored in an airtight container. Store in a Flinn *Chem-Saf*® Bag.
Disposal: #10
Shelf Life: Poor unless kept tightly capped.
Soluble: Water
Color: Buff
Odor: None
CAS No. 8006-28-8



Technical Note: This soda lime is a mixture of calcium oxide and sodium hydroxide in pellet form intended for the absorption of carbon dioxide or water.

No Need to Repackage

Flinn sodium is packaged ready-to-use and ready-to-store. Five small pieces of sodium (0.3–0.5 g each), perfect for demonstrations, are packaged under mineral oil in a PVC-coated glass bottle. The bottle is in a plastic bag and then a metal can for safer storage. Count on Flinn for the safest package.



Sodium

reagent grade, lumps
Na
A.W. 22.9896

S0329	Bottle of 5 small pieces for demonstration	$ 8.63
S0232	25 g	14.73
S0034	100 g	42.13
S0035	250 g	66.73

(All package sizes packaged under mineral oil in PVC-coated bottles, and then in a metal can for safer storage.)

★ HAZARD ALERT: A flammable, corrosive solid; dangerous when exposed to heat or flame; dangerous by reaction with moist air, water or any oxidizer. Spontaneously flammable when heated in air; reacts violently with water, producing very dangerous hydrogen gas and a solution of corrosive sodium hydroxide.
Storage: Inorganic #1 under dry mineral oil and inside a Flinn *Saf-Stor*® Can. Sodium metal must always be stored under dry mineral oil to prevent contact with moist air.

Continued on next column.

SODIUM *continued*

Disposal: #3
Shelf Life: Good, if stored safely.
Color: New material: metallic gray. Old material: white gray.
Odor: Metal itself is odorless but is usually stored under an oil or kerosene, either of which may have an odor.
CAS No. 7440-23-5



Technical Note: As you handle sodium be particularly attentive to the use of **dry** utensils and an entirely dry work surface. Use all appropriate personal safety apparel, i.e., gloves, apron, face shield, etc. Sodium would be the better choice to demonstrate the characteristics of an alkali metal than potassium. Potassium may develop potentially explosive peroxides.

Need a Safe Demo for Sodium?

Try dropping a small piece (0.3 g) of sodium into a cylinder containing water and mineral oil. The sodium falls through the top layer of mineral oil, reacts with the water at the interface, and is then carried back into the mineral oil layer by the hydrogen bubbles. The sodium keeps *swimming* between the water interface and the mineral oil. Safe, easy and a great demo.

Use Flinn precut sodium pieces or try the *Safe Swimming with Sodium* chemical demonstration kit (AP8916) found on page 346.



Sodium Acetate

acetic acid, sodium salt
reagent grade, crystal
$CH_3CO_2Na \bullet 3H_2O$
F.W. 136.08

S0036	100 g	$ 5.20
S0037	500 g	13.00

★ HAZARD ALERT: Skin, eye and respiratory irritant. LD_{50} 3530 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; substance efflorescent.
Soluble: Water; slightly in alcohol.
Color: White
Odor: Faint vinegar
CAS No. 6131-90-4



Sodium Acetate

anhydrous
laboratory grade, powder
CH_3CO_2Na
F.W. 82.03

S0344	100 g	$ 5.45
S0038	500 g	10.95

For hazard alert, storage, disposal, etc., see Sodium Acetate, S0036.
CAS No. 127-09-3



What Does TLV Mean?

Threshold Limit Value (TLV) is an estimate of the average safe substance concentration that can be tolerated on a repeat basis, usually during an 8-hour period on a day-to-day basis. The units of TLV are parts per million (ppm) or milligrams per cubic meter (mg/m^3). The TLV is usually defined for airborne hazards such as gases, mists, dust, etc. For more information, review the article on pages 928–929.

Sodium Acetate, Gramolpak

1.0 Molar
(as $CH_3CO_2Na \bullet 3H_2O$) * **S0383** pkg. **$8.80**

For hazard alert, storage, disposal, etc., see Sodium Acetate, S0036.

*Gramolpak® is a unique package which makes 250 mL with distilled water.





Sodium Acetate Solution

(as $CH_3CO_2Na \bullet 3H_2O$)

0.5 Molar	**S0346**	500 mL	**$5.60**
0.1 Molar	**S0345**	500 mL	**5.25**

For hazard alert, storage, disposal, etc., see Sodium Acetate, S0036.

Color: Colorless
Odor: None



Sodium Acid Phosphate

see Sodium Phosphate, Monobasic

Sodium Alginate

algin; alginic acid, sodium salt
laboratory grade
$(C_6H_7O_6Na)_n$ **S0445** 25 g **$9.75**

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Tan
Odor: None
CAS No. 9005-38-3



Sodium Aluminum Sulfate

see Aluminum Sodium Sulfate

Sodium Arsenate

dibasic
reagent grade, granular **S0331** 25 g **$34.30**
$Na_2HAsO_4 \bullet 7H_2O$ **S0181** 100 g **75.63**
F.W. 312.01

★ **HAZARD ALERT:** Highly toxic by ingestion and inhalation. *Known carcinogen.*

Storage: Inorganic #7 in a Flinn *Chem-Saf*® Bag, and then in a locked poisons cabinet.
Disposal: #27d
Shelf Life: Indefinite
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 10048-95-0



What Does Moderately Toxic Mean?

Flinn Scientific uses a toxicity standard similar to the *Prudent Practices in the Laboratory* standard. Flinn defines moderately toxic materials as those with an Oral—Rat LD_{50} of 250–1000 mg/kg or Inhalation—Rat LC_{50} of 220–2200 ppm/hr. For a 50-kg person (about 110 lbs), 250 mg/kg translates into consuming about 2.5 teaspoons of the chemical; 1000 mg/kg is almost 4 tablespoons! Rely on Flinn to help you understand chemical hazards and how they can affect you.

Sodium Arsenite, Meta

reagent grade, powder
$NaAsO_2$ **S0332** 25 g **$34.50**
F.W. 129.90

★ **HAZARD ALERT:** Highly toxic by ingestion and inhalation. *Alleged carcinogen.* LD_{50} 41 mg/kg.

Storage: Inorganic #7 in a Flinn *Chem-Saf*® Bag, and then in a locked poisons cabinet.
Disposal: #27d
Shelf Life: Absorbs carbon dioxide from the air; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, slightly in alcohol.
Color: White
Odor: None
CAS No. 7784-46-5



Sodium Azide

laboratory grade
NaN_3 **S0177** 10 g **$11.65**
F.W. 65.01

★ **HAZARD ALERT:** Highly toxic; substance decomposes explosively upon heating, shock, concussion or friction. Reacts with silver, copper and some other metals to form compounds that are shock-sensitive. Explodes when heated. LD_{50} 27 mg/kg. TLV 0.29 mg/m^3.

Storage: Inorganic #3 in a Flinn *Chem-Saf*® Bag in a locked poisons cabinet.
Disposal: #8
Shelf Life: Indefinite
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 26628-22-8



Safety Suggestion: Keep this material off of school premises unless there is an overriding educational purpose for its use.
Technical Note: Use for modified Winkler D.O. test; 10 g is enough for 1000 tests.

Sodium Benzoate

benzoic acid, sodium salt
laboratory grade, powder
$C_6H_5CO_2Na$ **S0307** 100 g **$ 8.10**
F.W. 144.11 **S0182** 500 g **13.35**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 532-32-1



Sodium Bicarbonate

sodium hydrogen carbonate, baking soda
powder
$NaHCO_3$
F.W. 84.01

Reagent	**S0042**	500 g	**$ 5.70**
Laboratory grade	**S0043**	500 g	**$ 4.00**
	S0044	2 kg	**10.00**

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Stable under dry storage conditions; slowly decomposes in moist air; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 144-55-8



Sodium Bicarbonate, Gramolpak

0.1 Molar
(as $NaHCO_3$) * **S0385** pkg. **$4.45**

For storage, disposal, etc., see Sodium Bicarbonate, S0042.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Sodium Bicarbonate Solution

Saturated
(as $NaHCO_3$) **S0267** 500 mL **$6.80**

Storage: Inorganic #4
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Sodium Bicarbonate Solution

0.5 Molar
(as $NaHCO_3$) **S0268** 500 mL **$4.80**

For storage, disposal, etc., see Sodium Bicarbonate Solution, S0267.



Sodium Biphosphate

see Sodium Phosphate, monobasic

Sodium Bismuthate

laboratory grade, powder
$NaBiO_3$ **S0308** 5 g **$15.20**
F.W. 279.97 **S0045** 10 g **29.95**

★ **HAZARD ALERT:** Oxidizer; body tissue irritant.
Storage: Inorganic #7
Disposal: #26a
Shelf Life: Somewhat hygroscopic; slowly decomposes on storage. Store in a Flinn *Chem-Saf*® Bag.
Soluble: Decomposes in hot water and acids; insoluble in cold water.
Color: Yellow
Odor: None
CAS No. 12232-99-4



Sodium Bisulfate

sodium hydrogen sulfate
reagent grade, crystal
$NaHSO_4 \cdot H_2O$ **S0214** 100 g **$11.85**
F.W. 138.08 **S0046** 500 g **21.65**

★ **HAZARD ALERT:** Body tissue irritant; moderately toxic.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Hygroscopic; keep tightly closed; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: White
Odor: None
CAS No. 10034-88-5



Sodium Bisulfite

sodium hydrogen sulfite
reagent grade, granular
$NaHSO_3$ **S0047** 500 g **$6.90**
F.W. 104.07

★ **HAZARD ALERT:** Severe irritant to skin and tissue as an aqueous solution; slightly toxic. LD_{50} 2000 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Substance very hygroscopic; keep tightly capped and in a cool location; store in a Flinn *Chem-Saf*® Bag.

Continued on next column.

SODIUM BISULFITE *continued*

Soluble: Water
Color: White
Odor: Faint sulfur
CAS No. 7631-90-5



Technical Note: Sodium bisulfite is a mixture of sodium bisulfite and sodium metabisulfite, depending on the amount of hydration that has occurred.

Sodium Bisulfite, meta

see Sodium meta-Bisulfite

Sodium Borate

borax, sodium tetraborate; powder
$Na_2B_4O_7 \cdot 10H_2O$
F.W. 381.42

Reagent **S0334** 100 g **$ 5.60**
S0049 500 g **11.40**
Laboratory grade **S0435** 500 g **$ 7.65**

★ **HAZARD ALERT:** Slightly toxic by inhalation and ingestion. LD_{50} 2660 mg/kg.
Storage: Inorganic #8
Disposal: #26a
Shelf Life: Material efflorescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and glycerin; not alcohol.
Color: White
Odor: None
CAS No. 1303-96-4



Sodium Borate Solution

4%, aqueous
(as $Na_2B_4O_7 \cdot 10H_2O$) **S0363** 500 mL **$4.55**
S0364 1 liter **8.30**

Storage: Inorganic #8
Disposal: #26a
Shelf Life: Indefinite
Color: Colorless
Odor: None



Sodium Bromate

reagent grade, crystal
$NaBrO_3$ **S0310** 25 g **$ 6.80**
F.W. 150.91 **S0164** 100 g **12.21**

★ **HAZARD ALERT:** Powerful oxidizing agent; keep from contact with organic material; toxic by ingestion; skin irritant. LD_{50} 300 mg/kg.
Storage: Inorganic #6
Disposal: #12a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 7789-38-0



Ruptured Bottles and Containers

Chemicals are frequently released on your storage shelves as a result of the rupture of a chemical container. Corroded metal cans of red phosphorus, broken containers of calcium oxide and inappropriate containers like peanut butter jars are all part of the problem. The schools with the biggest problem are frequently the same schools who buy chemicals on low price bids. Result: You buy trouble at low prices. The final cost can be very high!

Sodium Bromide

reagent grade, granular

NaBr	S0215	100 g	$ 7.00
F.W. 102.90	S0050	500 g	15.90

★ **HAZARD ALERT:** Slightly toxic by ingestion or inhalation. LD_{50} 3500 mg/kg.

Storage: Inorganic #2

Disposal: #26a

Shelf Life: Product absorbs water from air; keep tightly closed; store in a Flinn *Chem-Saf*® Bag.

Soluble: Water; slightly in alcohol.

Color: White

Odor: None

CAS No. 7647-15-6



Sodium Bromide, Gramolpak

0.1 Molar

(as NaBr)	* S0386	pkg.	$4.65

For hazard alert, storage, disposal, etc., see Sodium Bromide, S0215.

*Gramolpak® is a unique package which makes 1 liter with distilled water.



Sodium Bromide Solution

(as NaBr)

1 Molar*	S0368	500 mL	$8.90
0.1 Molar†	S0269	500 mL	5.15

★ **HAZARD ALERT:** Toxic by ingestion.

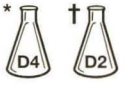
Storage: Inorganic #2

Disposal: #26b

Shelf Life: Good

Color: Colorless

Odor: None



Sodium Carbonate

soda ash, anhydrous
granular
Na_2CO_3
F.W. 105.99

Reagent	S0051	500 g	$ 8.35
Laboratory grade	S0052	500 g	$ 4.90
	S0053	2 kg	9.60
	S0309	12 kg	42.30

★ **HAZARD ALERT:** May be skin irritant. LD_{50} 4090 mg/kg.

Storage: Inorganic #4

Disposal: #26a

Shelf Life: Hygroscopic; keep tightly closed; store in a Flinn *Chem-Saf*® Bag.

Soluble: Water, glycerin; not alcohol.

Color: White

Odor: None

CAS No. 497-19-8



Some Clothing Rules You Might Consider

1. No loose clothing that can easily become entangled with lab apparatus.
2. No sandals or open-toed shoes.
3. Long hair should be restricted and, if possible, hair lacquer should be avoided on lab days.
4. Wear aprons or lab coats whenever possible.

Sodium Carbonate

monohydrate
reagent grade, crystal

$Na_2CO_3 \cdot H_2O$	S0054	500 g	$ 7.85
F.W. 124.00	S0055	2 kg	28.90

For hazard alert, storage, disposal, etc., see Sodium Carbonate, S0051.

CAS No. 5968-11-6



Sodium Carbonate, Gramolpak

1 Molar

(as Na_2CO_3)	* S0387	pkg.	$4.65

For hazard alert, storage, disposal, etc., see Sodium Carbonate, S0051.

*Gramolpak® is a unique package which makes 250 mL with distilled water.



Sodium Carbonate Solution

Saturated

about 100 g/500 mL (as Na_2CO_3)	S0233	500 mL	$7.15

Storage: Inorganic #4

Disposal: #26b

Shelf Life: Good

Color: Colorless

Odor: None

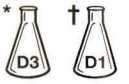


Sodium Carbonate Solution

(as Na_2CO_3)

1 Molar*	S0234	500 mL	$5.00
0.1 Molar†	S0235	500 mL	4.90

For storage, disposal, etc., see Sodium Carbonate Solution, S0233.



Sodium Chlorate

$NaClO_3$
F.W. 106.45

Reagent	S0216	100 g	$ 9.71
granular	S0058	500 g	21.51
Laboratory grade	S0059	500 g	$ 8.01
crystal	S0060	2 kg	24.41

★ **HAZARD ALERT:** Dangerous fire risk; strong oxidant; contact with organic material may cause fire; slightly toxic. LD_{50} 1200 mg/kg.

Storage: Inorganic #6

Disposal: #12a

Shelf Life: Indefinite

Soluble: Water and alcohol

Color: White

Odor: None

CAS No. 7775-09-9



Sodium Chloride

crystal
NaCl
F.W. 58.45

Reagent	S0061	500 g	$ 5.45
	S0062	2 kg	16.65
Laboratory grade	S0063	500 g	$ 3.65
	S0064	2 kg	6.40
	S0311	12 kg	25.00
Laboratory grade	S0065	1 kg	$ 5.95
rock salt, coarse			

Storage: Inorganic #2

Disposal: #26a

Shelf Life: Somewhat hygroscopic; keep tightly closed.

Soluble: Water and slightly in alcohol.

Color: White

Odor: None

CAS No. 7647-14-5



Sodium Chloride, Gramolpak

1 Molar (as NaCl) * **S0388** pkg. **$4.90**

For storage, disposal, etc., see Sodium Chloride, S0061.

*Gramolpak® is a unique package which makes 1 liter with distilled water.

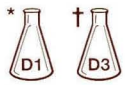


Sodium Chloride Solution

(as NaCl)

Saturated* approx. 190 g/500 mL	**S0236**	500 mL	**$6.55**
1 Molar†	**S0347**	500 mL	**5.50**
0.5 Molar†	**S0348**	500 mL	**5.10**
0.1 Molar*	**S0237**	500 mL	**5.10**

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Sodium Chloride Conductivity Standard

Conductivity calibration standards

	S0427	65 mL (500 mg/L)	**$ 4.40**
	AP9111	kit	**19.95**

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Technical Note: AP9111 contains four 500-mL bottles of conductivity calibration standards, one each of 50 mg/L, 500 mg/L, 1000 mg/L, and 5000 mg/L total dissolved solids. S0427 is a small bottle containing a solution of 500 mg/L total dissolved solids.

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Sodium Chromate

tetrahydrate
reagent grade, crystal
$Na_2CrO_4 \cdot 4H_2O$
F.W. 234.06

S0313	25 g	**$ 5.90**
S0277	100 g	**22.85**
S0066	500 g	**69.55**

★ **HAZARD ALERT:** Highly toxic by ingestion, inhalation, and skin absorption; *known carcinogen;* oxidizer. LD_{50} 52 mg/kg.
Storage: Inorganic #8 in a Flinn *Chem-Saf®* Bag, and then in a locked poisons cabinet.
Disposal: #12a
Shelf Life: Substance is efflorescent; store in a Flinn *Chem-Saf®* Bag.
Soluble: Water; slightly in alcohol.
Color: Yellow
Odor: None
CAS No. 10034-82-9



Sodium Chromate

anhydrous
laboratory grade, granular
Na_2CrO_4
F.W. 161.97

S0278	100 g	**$ 6.25**
S0067	500 g	**12.70**

For hazard alert, storage, disposal, etc., see Sodium Chromate, S0313.
Color: Yellow
Odor: None
CAS No. 7775-11-3



Sodium Chromate, Gramolpak

0.1 Molar (as Na_2CrO_4) * **S0389** pkg. **$6.05**

For hazard alert, storage, disposal, etc., see Sodium Chromate, S0313.

*Gramolpak® is a unique package which makes 1 liter with distilled water.



Flinn Gramolpaks® make solution preparation easy.

Sodium Chromate Solution

0.1 Molar
(as $Na_2CrO_4 \cdot 4H_2O$) **S0239** 500 mL **$6.55**

★ **HAZARD ALERT:** Toxic by ingestion; *known carcinogen.*
Storage: Inorganic #8
Disposal: #12a
Shelf Life: Indefinite
Color: Yellow
Odor: None



Sodium Citrate

citric acid, trisodium salt
laboratory grade, granular
$Na_3C_6H_5O_7 \cdot 2H_2O$
F.W. 294.10

S0068 500 g **$9.95**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 6132-04-3



Sodium Cobaltinitrite

sodium hexanitrocobaltate(III)
for detection of potassium
reagent grade, powder
$Na_3Co(NO_2)_6$
F.W. 403.96

S0192	25 g	**$10.75**
S0193	100 g	**35.90**

★ **HAZARD ALERT:** Slightly toxic by ingestion; body tissue irritant; possible sensitizer.
Storage: Inorganic #3
Disposal: #27f
Shelf Life: Indefinite; an aqueous solution would decompose slowly. If a few drops of acetic acid are added to a solution, its shelf life can be extended for about three months.
Soluble: Water; slightly in alcohol.
Color: Mustard
Odor: Medicine-like
CAS No. 13600-98-1



Pipeting

Simple rule: If you use a pipet—you use a pipet bulb or safety filler. Never, ever pipet by mouth! You don't know where that pipet has been or what chemicals are in it. You should never chance getting a chemical in your mouth.

Sodium Cyanide

laboratory grade, granular

NaCN	S0312	100 g	$19.43
F.W. 49.01		(Packaged in PVC-coated bottles)	

★ **HAZARD ALERT:** *Highly toxic;* poison by ingestion, absorption through injured skin or inhalation of hydrogen cyanide. (Hydrogen cyanide can be liberated from sodium cyanide by the action of carbon dioxide or acids.) LD_{50} 6.4 mg/kg.

Storage: Inorganic #7 in a Flinn *Chem-Saf*® Bag and then locked up in a poisons cabinet.

Disposal: #14

Shelf Life: Good if stored safely. Never store this material in a naked glass bottle. Always provide an outer bag barrier in the event of breakage.

Soluble: Water; slightly in alcohol.

Color: White

Odor: None

CAS No. 143-33-9



Safety Purchase Suggestion: Keep this material off school premises unless there is an overriding educational purpose for its use, then store it properly as suggested above.

Sodium Desoxycholate

deoxycholic acid, sodium salt
a bile acid

	S0314	5 g	$ 7.50
		(Packaged in PVC-coated bottles)	
	S0174	25 g	28.35

Storage: Organic #1

Disposal: #26a

Shelf Life: Indefinite

Soluble: Acetone, solutions of alkali hydroxides, alcohol; very slightly in alcohol.

Color: White

Odor: None

CAS No. 302-95-4



Sodium Dichromate

laboratory grade, granular

$Na_2Cr_2O_7 \cdot 2H_2O$	S0071	250 g	$5.30
F.W. 298.03	S0070	500 g	9.95

★ **HAZARD ALERT:** *Known carcinogen* as dust; corrosive to skin; harmful to eyes and respiratory tract; highly toxic. LD_{50} 52 mg/kg.

Storage: Inorganic #8 in a Flinn *Chem-Saf*® Bag, and then in a locked poisons cabinet.

Disposal: #12a

Shelf Life: Deliquescent; keep tightly closed; store in a Flinn *Chem-Saf*® Bag.

Soluble: Water; not alcohol.

Color: Orange

Odor: None

CAS No. 7789-12-0



Your Biosystem

As you think about toxicity, try to think about ease of entry into your biosystem.

A. Gases or vapors are absorbed more rapidly than liquids.

B. Liquids are, in turn, absorbed more rapidly than solids.

If you think about the physical property of the hazard, that will help you to take protective measures.

Sodium Dichromate, Gramolpak

0.1 Molar

(as $Na_2Cr_2O_7 \cdot 2H_2O$)	* S0391	pkg.	$4.60

For hazard alert, storage, disposal, etc., see Sodium Dichromate, S0071.

*Gramolpak® is a unique package which makes 1 liter with distilled water.





Sodium Dichromate Solution

0.1 Molar

(as $Na_2Cr_2O_7 \cdot 2H_2O$)	S0240	500 mL	$5.60

★ **HAZARD ALERT:** *Known carcinogen;* may be skin irritant; toxic.

Storage: Inorganic #8

Disposal: #12a

Shelf Life: Good

Color: Orange/red

Odor: None



Sodium Dihydrogen Phosphate

see Sodium Phosphate, Monobasic

Sodium Diphenylamine Sulfonate

diphenylamine-4-sulfonic acid, sodium salt
redox indicator
reagent grade

$C_6H_5NHC_6H_4SO_3Na$	S0365	1 g	$12.45
F.W. 271.28	S0366	5 g	33.15

Storage: Organic #2

Disposal: #18b

Shelf Life: Indefinite

Soluble: Partially in water.

Color: White

Odor: Flower-like

CAS No. 6152-67-6



Sodium Dithionite

sodium hydrosulfite
laboratory grade, powder

$Na_2S_2O_4$	S0446	25 g	$ 5.70
F.W. 174.11	* S0315	100 g	7.93
	* S0072	500 g	15.93



Due to D.O.T. regulations, these products must be shipped via truck. Truck freight is very expensive, $75 or more. Try to order the 25-g size or as many other items as possible to justify this very high shipping cost.

★ **HAZARD ALERT:** Strong reducing agent; oxidizes in the presence of water to produce heat and possible ignition; fire risk; contact with water produces toxic and corrosive materials.

Storage: Inorganic #2

Disposal: #12b

Shelf Life: Poor; keep tightly closed; store in a Flinn *Chem-Saf*® Bag.

Soluble: Partially in water; not alcohol.

Color: White

Odor: Strong sulfurous

CAS No. 7775-14-6



Sodium Dodecyl Sulfate

see Dodecyl Sulfate, Sodium Salt

Sodium Ethanoate

see Sodium Acetate

Sodium Fluoride

laboratory grade, powder

NaF	S0316	100 g	$ 8.90
F.W. 41.99	S0073	500 g	12.65

★ **HAZARD ALERT:** Highly toxic by ingestion and inhalation; strong skin irritant. LD_{50} 52 mg/kg.

SODIUM FLUORIDE continued on next page.

SODIUM FLUORIDE *continued*

Storage: Inorganic #2 in a Flinn *Chem-Saf*® Bag, and then in a locked poisons cabinet.
Disposal: #6
Shelf Life: Indefinite
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 7681-49-4



Sodium Fluoride, Gramolpak

0.1 Molar (as NaF)	* S0392	pkg.	$6.30

For hazard alert, storage, disposal, etc., see Sodium Fluoride, S0316.
*Gramolpak® is a unique package which makes 1 liter with distilled water.





Sodium Fluoride Solution

0.1 Molar (as NaF)	S0241	500 mL	$5.60

★ **HAZARD ALERT:** Toxic by ingestion; may be skin irritant.
Storage: Inorganic #2
Disposal: #6
Shelf Life: Good
Color: Colorless
Odor: None





You need up-to-date Material Safety Data Sheets (MSDS) to safely use, store, or dispose of chemicals. For this reason, Flinn sends an MSDS with each and every chemical you purchase. Count on Flinn as your safer source for science supplies.

Sodium Hexametaphosphate

Calgon®, sodium polyphosphate
laboratory grade
$(NaPO_3)_n$
F.W. $(100.98)_n$

S0430	100 g	$ 7.00
S0431	500 g	14.95

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair; slightly hygroscopic.
Soluble: Soluble in water.
Color: White
Odor: None
CAS No. 10124-56-8
Technical Note: Use in place of Calgon for water softening activities.



Sodium Hexanitrocolbaltate(III)

see Sodium Cobaltinitrite

Sodium Hydrogen Carbonate

see Sodium Bicarbonate

Sodium Hydrogen Sulfate

see Sodium Bisulfate

Sodium Hydrosulfite

see Sodium Dithionite

Sodium Hydroxide

caustic soda, soda lye
NaOH
F.W. 40.00

Reagent	S0074	100 g	$ 5.90
pellet	S0075	500 g	10.05
	S0076	2 kg	31.41
Laboratory grade	S0279	500 g	$ 5.70
flake	S0077	2 kg	15.51

★ **HAZARD ALERT:** Corrosive solid; skin burns are possible; much heat evolves when added to water; very dangerous to eyes; wear face and eye protection when using this substance. Wear gloves. TLV 2 mg/m^3.
Storage: Inorganic #4
Disposal: #10
Shelf Life: Good; keep tightly closed.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 1310-73-2





See page 37 for a detailed explanation of the Flinn Hazard and Usefulness Code.

Sodium Hydroxide, Gramolpak

(as NaOH)

6 Molar	* S0393	pkg. (Makes 250 mL)	$10.90
1 Molar	* S0394	pkg. (Makes 1 L)	5.35
0.1 Molar	* S0292	pkg. (Makes 1 L)	5.15

For hazard alert, storage, disposal, etc., see Sodium Hydroxide, S0074.
*Gramolpak® is a unique package which makes a known solution with distilled water.

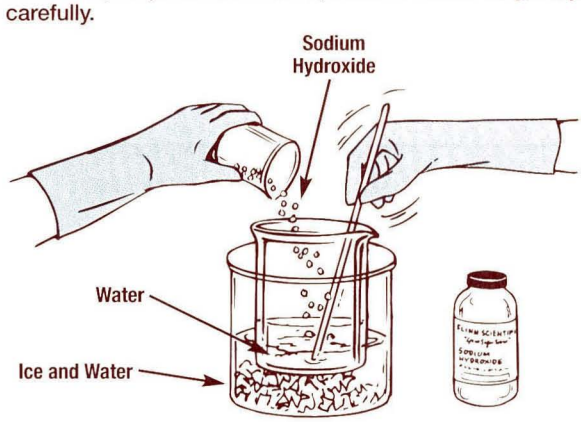




Sodium Hydroxide and Heat

Preparing Sodium Hydroxide Solution?

A great amount of heat is liberated when sodium hydroxide and water are mixed. The temperature of the solution may rise very rapidly. In fact, the temperature may rise so fast that the solution may boil and possibly spatter a hot, caustic solution. Consider immersing your mixing vessel in a bucket of ice to control the solution temperature. Add ingredients slowly while stirring continuously. If you use a glass vessel, *it must be Pyrex*® and it must be free of any scratches, chips or breaks. Inspect the vessel very, very carefully.



Sodium Hydroxide Solution

50%
(as NaOH) **S0217** 100 mL **$ 6.85**
approx. 19 M **S0078** 500 mL **15.15**

★ **HAZARD ALERT:** Corrosive liquid; skin burns are possible; very dangerous to eyes; wear gloves.
Storage: Inorganic #4
Disposal: #10
Shelf Life: Good if kept tightly closed.
Color: Colorless
Odor: None



Sodium Hydroxide Solution

(as NaOH)

6 Molar*	**S0242**	500 mL	**$8.10**
3 Molar†	**S0447**	500 mL	**7.40**
1 Molar†	**S0148**	500 mL	**5.70**
0.5 Molar†	**S0243**	500 mL	**5.70**
0.2 Molar§	**S0244**	500 mL	**5.70**
0.1 Molar†	**S0149**	500 mL	**4.95**

For hazard alert, storage, disposal, etc., see Sodium Hydroxide Solution, S0217.



Sodium Hypochlorite Solution

bleach, 5% available chlorine
NaOCl **S0079** 500 mL **$ 5.00**
F.W. 74.44 **S0080** 1 liter **7.55**
S0081 4 liters **13.45**

★ **HAZARD ALERT:** Corrosive liquid; causes skin burns; reacts with acid to evolve chlorine gas; evolves chlorine when heated; moderately toxic by ingestion and inhalation; avoid contact with organic material.
Storage: Inorganic #6
Disposal: #26b
Shelf Life: Good
Color: Faint yellow
Odor: Chlorine, bleach-like
CAS No. 7681-52-9
Technical Note: Flinn sodium hypochlorite solution contains 5–5½% w/v sodium hypochlorite.



Sodium Hyposulfite

see Sodium Thiosulfate

Sodium Iodate

laboratory grade, powder
$NaIO_3$ **S0218** 25 g **$ 8.90**
F.W. 197.90 **S0082** 100 g **17.95**

★ **HAZARD ALERT:** Oxidant; fire risk in contact with organic material; slightly toxic by ingestion.
Storage: Inorganic #6
Disposal: #12a

Continued on next column.

Dangerous Alcohol Burners

We understand that the use of alcohol burners may be a necessity. They are, however, a constant source of accidents. Science teachers should consider other less troublesome sources of heat. If you were to consider the long-term economics and, surely the safety factor, small hot plates might be the answer. If you must use alcohol burners, add some table salt to your alcohol supply. The flame will be more visible and thus safer. Or, you may buy Flinn Burner Fuel which has the sodium salt added.

SODIUM IODATE *continued*

Shelf Life: Deliquescent; changes color on exposure to light; keep tightly closed; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and acetone; not alcohol.
Color: White
Odor: Faint iodine
CAS No. 7681-55-2



Sodium Iodide

granular
NaI
F.W. 149.92

Reagent	**S0083**	25 g	**$ 7.95**
	S0084	100 g	**13.10**
	S0085	500 g	**52.75**
Laboratory grade	**S0436**	100 g	**$12.20**
	S0437	500 g	**42.90**

★ **HAZARD ALERT:** Slightly toxic. LD_{50} 4340 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Deliquescent; changes color on exposure to light; keep tightly closed; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water, alcohol and glycerin.
Color: White
Odor: None
CAS No. 7681-82-5



Sodium Iodide, Gramolpak

0.1 Molar
(as NaI) * **S0396** pkg. **$5.30**

For hazard alert, storage, disposal, etc., see Sodium Iodide, S0083.
*Gramolpak® is a unique package which makes 1 liter with distilled water.



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Sodium Iodide Solution

(as NaI)

0.5 Molar	**S0369**	500 mL	**$13.10**
0.1 Molar	**S0245**	500 mL	**6.50**

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good, if kept tightly closed.
Color: Colorless
Odor: None



Sodium Lauryl Sulfate

see Dodecyl Sulfate, Sodium Salt

Sodium meta-Bisulfite

sodium pyrosulfate
reagent grade, granular
$Na_2S_2O_5$ **S0317** 100 g **$ 5.40**
F.W. 190.11 **S0087** 500 g **10.55**

★ **HAZARD ALERT:** Skin and tissue irritant; slightly toxic by ingestion. LD_{50} 3200 mg/kg.
Storage: Inorganic #2
Disposal: #12b
Shelf Life: Poor; moisture-sensitive.
Soluble: Water; slightly in alcohol.
Color: White
Odor: Sulfur-like
CAS No. 7681-57-4



Sodium Metasilicate

laboratory grade, crystal
$Na_2SiO_3 \cdot 9H_2O$
F.W. 284.20

S0157	100 g	$ 5.45
S0158	500 g	12.20

★ **HAZARD ALERT:** Slightly toxic by ingestion; body tissue irritant. LD_{50} 1153 mg/kg.
Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water (cold); not alcohol.
Color: White
Odor: None
CAS No. 13517-24-3



Technical Note: Cannot be used to make sodium silicate solutions for use in crystal-growing experiments or the preparation of a Superball®. Sodium silicate solution must be prepared at high pressure and cannot be made in lab. See page 159 for commercial sodium silicate (water glass) solution.

Sodium Molybdate(VI)

reagent grade, crystal
$Na_2MoO_4 \cdot 2H_2O$
F.W. 241.97

S0318	5 g	$ 7.45
S0219	25 g	15.75

★ **HAZARD ALERT:** Slightly toxic by ingestion.
Storage: Inorganic #8
Disposal: #6
Soluble: Water
Color: White
Odor: None
CAS No. 10102-40-6



Sodium Monohydrogen Phosphate

see Sodium Phosphate, Dibasic

Sodium Nitrate

$NaNO_3$
F.W. 84.99

Reagent	S0281	100 g	$ 8.95
crystal	S0088	500 g	18.20
Laboratory grade	S0090	500 g	$ 5.55
granular	S0091	2 kg	11.50

★ **HAZARD ALERT:** Strong oxidizer; avoid friction or shock—explosions have occurred; moderately toxic by ingestion. LD_{50} 3236 mg/kg.
Storage: Inorganic #3
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; slightly in alcohol.
Color: White
Odor: None
CAS No. 7631-99-4



Sodium Nitrate, Gramolpak

0.2 Molar
(as $NaNO_3$) * S0397 pkg. $5.15

For hazard alert, storage, disposal, etc., see Sodium Nitrate, S0281.
*Gramolpak® is a unique package which makes 1 liter with distilled water.





Sodium Nitrate Solution

(as $NaNO_3$)

0.5 Molar	S0246	500 mL	$6.00
0.1 Molar	S0248	500 mL	6.00

Storage: Inorganic #3
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: None



Sodium Nitrite

reagent grade, granular
$NaNO_2$
F.W. 69.00

S0220	100 g	$ 9.81
S0092	500 g	22.01

★ **HAZARD ALERT:** Strong oxidizer; fire and explosion risk if heated; highly toxic by ingestion and inhalation. LD_{50} 85 mg/kg.
Storage: Inorganic #3 in a Flinn *Chem-Saf*® Bag, and then in a locked poisons cabinet.
Disposal: #12b
Shelf Life: Indefinite
Soluble: Water; slightly in alcohol.
Color: Faint yellow
Odor: None
CAS No. 7632-00-0





Sodium Nitrite Solution

1 Molar
(as $NaNO_2$) S0370 500 mL $8.35

★ **HAZARD ALERT:** Moderately toxic by ingestion.
Storage: Inorganic #3
Disposal: #12b
Shelf Life: Indefinite
Color: Faint yellow
Odor: None



Sodium Nitroferricyanide

sodium nitroprusside
for detection of the amino acid cysteine
reagent grade, crystal
$Na_2Fe(CN)_5NO \cdot 2H_2O$
F.W. 297.91

S0319	5 g	$ 8.55
S0221	25 g	33.90

★ **HAZARD ALERT:** Highly toxic by ingestion and inhalation.
Storage: Inorganic #7
Disposal: #14
Shelf Life: Poor; hygroscopic.
Soluble: Water; slightly in alcohol.
Color: Red/purple
Odor: None
CAS No. 13755-38-9



Sodium Oleate

oleic acid, sodium salt
$C_{17}H_{33}COONa$ S0349 100 g $5.10
F.W. 304.45

Storage: Organic #1
Disposal: #18b
Shelf Life: Good, if kept tightly closed.
Soluble: Water (with decomposition); alcohol.
Color: Off-white
Odor: Soap-like
CAS No. 143-19-1



Height of Chemical Storage

A good general rule is that chemicals should not be stored above eye level. This rule negates the need for ladders, stools and other potentially unsafe devices in the chemical storeroom. At least get those large, oversize bottles always found on your top shelves situated more safely. Look at the chemicals on the top shelf. If these materials have not been used in the recent past and won't be needed in the near future, then dispose of them now!

Sodium Oxalate

powder
$Na_2C_2O_4$
F.W. 134.00

Reagent	**S0422**	25 g	**$ 7.25**
	S0094	100 g	**14.83**
	S0095	500 g	**40.83**
Laboratory grade	**S0438**	100 g	**$12.93**

★ **HAZARD ALERT:** Moderately toxic by ingestion; body tissue irritant.

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; hygroscopic.
Color: White
Odor: None
CAS No. 62-76-0



Sodium Oxalate Solution

0.1 Molar
(as $Na_2C_2O_4$) **S0249** 500 mL **$5.80**

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Clear
Odor: None



Special Note Regarding Oxygen Generation

Chemistry textbooks call for the use of sodium peroxide as a means of preparing oxygen. An alternative might be the use of hydrogen peroxide. 6% hydrogen peroxide when combined with manganese dioxide will generate oxygen. Potassium chlorate might be another choice, although we discourage the use of that material. If bottled oxygen is not available, oxygen can be generated by using 30% hydrogen peroxide (H_2O_2). Be cautious using 30% hydrogen peroxide. It causes burns. Use safety glasses and gloves. In case of a spill, wash the material off your person using copious quantities of water.

Set up a generator by inserting a dropping funnel into a two-hole rubber stopper equipped with a delivery tube. This stopper assembly is placed in a 250-mL flask. Place a gram or two of manganese dioxide (MnO_2) into the flask. Using distilled water, dilute 50 mL of 30% hydrogen peroxide to 100 mL. Add the diluted H_2O_2 via the dropping funnel as needed to release a steady flow of oxygen. You may want to dry the oxygen. If so, use a drying tube containing anhydrous calcium chloride ($CaCl_2$) or calcium sulfate ($CaSO_4$) to dry the gas. This amount of H_2O_2 will give about 5½ liters of oxygen at room temperature and sea level atmospheric pressure. For student use, provide only hydrogen peroxide that has already been diluted. A 5 or 6% solution reacts rapidly enough for this purpose and is safer to use. A potassium chlorate–manganese dioxide ($KClO_3$–MnO_2) reaction is not recommended. Many serious accidents have resulted from this combination, and under no circumstances should students ever use it. Should you elect to use potassium chlorate–manganese dioxide be sure that both materials have been strongly heated in separate evaporating dishes and that each is free of any organic or other reducing material. Be sure that none of the mixture gets on the rubber stopper of the generator.

Sodium Perborate

laboratory grade, granular
$NaBO_3 \cdot 4H_2O$ **S0328** 100 g **$18.00**
F.W. 153.88

★ **HAZARD ALERT:** Strong oxidant; avoid contact with organic material; slightly toxic by ingestion. LD_{50} 1200 mg/kg.

Storage: Inorganic #8
Disposal: #26a
Shelf Life: Decomposes on exposure to warm, moist air; store in a Flinn *Chem-Saf*® Bag.
Soluble: Slightly in water.
Color: White
Odor: None
CAS No. 10486-00-7



Sodium Peroxide

reagent grade, granular powder
Na_2O_2 **S0229** 25 g **$ 8.00**
F.W. 77.98 **S0230** 100 g **20.23**
S0231 500 g **90.63**

★ **HAZARD ALERT:** Serious explosion/fire risk. Avoid contact with water, alcohol, acids, powdered metals, and all organic materials. Strong oxidizing agent. Keep dry. Moderately toxic; corrosive to body tissue.

Storage: Inorganic #6
Disposal: #22a
Shelf Life: Reasonably good if stored safely.
Soluble: Cold water with evolution of heat.
Color: Yellow/white
Odor: None
CAS No. 1313-60-6



Sodium Phosphate, Monobasic

sodium dihydrogen phosphate
reagent grade, crystal
$NaH_2PO_4 \cdot H_2O$ **S0097** 100 g **$ 7.75**
F.W. 137.99 **S0098** 500 g **25.15**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Slightly hygroscopic.
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 10049-21-5



Sodium Phosphate (Monobasic) Solution

0.1 Molar
(as $NaH_2PO_4 \cdot H_2O$) **S0371** 500 mL **$5.40**

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: None



Sodium Phosphate, Dibasic

disodium hydrogen phosphate, heptahydrate
reagent grade, granular
$Na_2HPO_4 \cdot 7H_2O$ **S0222** 100 g **$ 9.50**
F.W. 268.07 **S0099** 500 g **19.40**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Hot water; not alcohol.
Color: White
Odor: None
CAS No. 7782-85-6



Sodium Phosphate, Dibasic

disodium hydrogen phosphate, anhydrous
reagent grade, powder
Na_2HPO_4
F.W. 141.96

	S0223	100 g	$ 9.55
	S0100	500 g	16.45

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Hygroscopic; keep tightly closed; store in a Flinn *Chem-Saf*® Bag.
Soluble: Hot water; not alcohol.
Color: White
Odor: None
CAS No. 7558-79-4

C3

Sodium Phosphate, Dibasic, Gramolpak

0.1 Molar
(as $Na_2HPO_4 \cdot 7H_2O$) * S0398 pkg. $7.35

For hazard alert, storage, disposal, etc., see Sodium Phosphate, Dibasic, S0222.
*Gramolpak® is a unique package which makes 1 liter with distilled water.

GRAMOL PAK FLINN C3

Sodium Phosphate (Dibasic) Solution

(as $Na_2HPO_4 \cdot 7H_2O$)

0.5 Molar	S0351	500 mL	$7.35
1.0 Molar	S0350	500 mL	7.35

For hazard alert, storage, disposal, etc., see Sodium Phosphate, Dibasic, S0222.
Color: Colorless
Odor: None

D4

Sodium Phosphate, Tribasic

TSP, trisodium phosphate
laboratory grade, granular
$Na_3PO_4 \cdot 12H_2O$ S0101 500 g $6.45
F.W. 380.12

★ **HAZARD ALERT:** Slightly toxic by ingestion; severe body tissue irritant. LD_{50} 6500 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: White
Odor: None
CAS No. 10101-89-0

C1

Technical Note: Excellent cleaner for washing wood acid cabinets.

Sodium Phosphate (Tribasic) Solution

0.1 Molar
($Na_3PO_4 \cdot 12H_2O$) S0250 500 mL $5.80

For hazard alert, storage, disposal, etc., see Sodium Phosphate, Tribasic, S0101.
Color: Colorless
Odor: None

C3

Sodium Polyacrylate

powder

	W0012	25 g	$ 4.80
	W0013	100 g	8.90
	W0014	500 g	21.75

Storage: Organic #3
Disposal: #26a
Shelf Life: Good if kept dry.
Soluble: Water
Color: White
Odor: None
CAS No. 9003-04-7

D3

Technical Note: Sodium polyacrylate is a super absorbent that will absorb about 800 times its weight in distilled water.

Sodium Potassium Tartrate

see Potassium Sodium Tartrate

Sodium Salicylate

salicylic acid, sodium salt
laboratory grade, powder
$2\text{-}(HO)C_6H_4CO_2Na$ S0224 100 g $17.55
F.W. 160.04

★ **HAZARD ALERT:** Slightly toxic by ingestion; body tissue irritant. LD_{50} 1200 mg/kg.
Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite; light sensitive.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 54-21-7

D4

Sodium Silicate, meta

see Sodium Metasilicate

**Minimize disposal concerns...
Consider smaller package sizes available throughout our chemical listings.**

Sodium Silicate Solution

water glass
laboratory grade

	S0102	500 mL	$ 4.75
	S0103	4 liters	16.50

★ **HAZARD ALERT:** Body tissue irritant.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: None

D3

Technical Note: This solution is 37–40% sodium silicate, (40–42 °Be, approx. density 1.40). It is prepared using a high-temperature, high-pressure process and cannot be made in lab.

Sodium Sulfamate Solution

0.5 Molar
(as $NaNH_2SO_3$) S0372 500 mL $11.05
(Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Skin irritant.
Storage: Inorganic #4
Disposal: #18b
Shelf Life: Good
Color: Colorless
Odor: None

D4

Can't Afford an Eyewash?

Consider acquiring a length of shower hose and a shower head from your local hardware store. Although this arrangement suffers due to variations in water pressure and water temperature, any source of clean, fresh water that can be used to flush the eyes is better than nothing. We also feel it would be better than plastic squeeze bottles with serious question marks about the bottle contents. The shower hose arrangement may also provide a needed lower body drench.

Sodium Sulfate

glauber's salt, decahydrate
reagent grade, crystal
$Na_2SO_4 \cdot 10H_2O$
F.W. 322.19

	S0225	100 g	**$10.45**
	S0104	500 g	**33.50**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Substance loses water of hydration at 100 °C; indefinite.
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 7727-73-3



Sodium Sulfate

anhydrous
Na_2SO_4
F.W. 142.02

Reagent	**S0105**	500 g	**$10.95**
granular	**S0106**	2 kg	**26.80**
Laboratory grade	**S0107**	500 g	**$ 3.80**
powder	**S0108**	2 kg	**11.95**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 7757-82-6

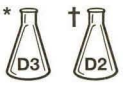


Sodium Sulfate Solution

(as Na_2SO_4)

Saturated solution*	**S0373**	500 mL	**$10.25**
1 Molar*	**S0352**	500 mL	**7.55**
0.5 Molar*	**S0353**	500 mL	**5.90**
0.1 Molar†	**S0251**	500 mL	**6.00**

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: None
Technical Note: The saturated solution is approximately 2 M in sodium sulfate.



Sodium Sulfide

chunk
$Na_2S \cdot 9H_2O$
F.W. 240.18

Reagent	**S0109**	100 g	**$13.91**
	S0110	500 g	**27.31**
Laboratory grade	**S0439**	100 g	**$ 8.31**

★ **HAZARD ALERT:** Dangerous fire and explosion risk; flammable solid; liberates toxic hydrogen sulfide on contact with acids; moderately toxic; corrosive to body tissue.

Continued on next column.

New Teachers and Safety Training

Many colleges and universities do not thoroughly instruct their science teachers-to-be in the aspects of safe chemical storage and handling. New teachers, no matter how ambitious and enthusiastic, need to be trained on the safety policies of the school's science department and the federal, state and local regulations the school must adhere to. Flinn Scientific has a terrific two-hour safety training video. See page 920 for a detailed description of this valuable safety training aid.

SODIUM SULFIDE *continued*

Storage: Inorganic #5 inside a Flinn *Saf-Stor*® Can.
Disposal: #23
Shelf Life: Deliquescent; store in a Flinn *Chem-Saf*® Bag and then inside a Flinn *Saf-Stor*® Can.
Soluble: Water; slightly in alcohol.
Color: Colorless
Odor: Rotten eggs
CAS No. 1313-84-4



Safer Purchasing Suggestion: See AITCH-TU-ESS as the substance to use to generate hydrogen sulfide gas.
Technical Note: Readily absorbs water from air. May appear as a slurry, especially under hot, humid conditions.

Sodium Sulfide, Gramolpak

0.1 Molar
(as $Na_2S \cdot 9H_2O$) *** S0399** pkg. **$9.60**

For hazard alert, storage, disposal, etc., see Sodium Sulfide, S0109.
*Gramolpak® is a unique package which makes 1 liter with distilled water.



Sodium Sulfide Solution

(as $Na_2S \cdot 9H_2O$)

2 Molar	**S0374**	500 mL	**$23.10**
0.1 Molar	**S0252**	500 mL	**6.35**

★ **HAZARD ALERT:** Skin irritant; liberates toxic hydrogen sulfide on contact with acids.
Storage: Inorganic #5
Disposal: #23
Shelf Life: Fair; darkens upon exposure to light and air.
Color: Colorless
Odor: Slight rotten eggs





Sodium Sulfite

anhydrous
laboratory grade, granular
Na_2SO_3
F.W. 126.05

S0111 500 g **$4.60**

★ **HAZARD ALERT:** Moderately toxic; possible body tissue irritant. LD_{50} 820 mg/kg.
Storage: Inorganic #2
Disposal: #12b
Shelf Life: Moisture-sensitive.
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 7757-83-7



Sodium Sulfite, Gramolpak

0.1 Molar
(as Na_2SO_3) *** S0400** pkg. **$4.35**

For hazard alert, storage, disposal, etc., see Sodium Sulfite, S0111.
*Gramolpak® is a unique package which makes 1 liter with distilled water.



Sodium Sulfite Solution

1 Molar
(as Na_2SO_3) **S0253** 500 mL **$6.25**

Storage: Inorganic #2
Disposal: #12b
Shelf Life: Good
Color: Colorless
Odor: None



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Sodium Sulfocyanide

see Sodium Thiocyanate

Sodium Tartrate

tartaric acid, disodium salt
laboratory grade, crystal
$Na_2C_4H_4O_6 \cdot 2H_2O$
F.W. 230.08

S0321	25 g	$11.95
S0112	100 g	32.50

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 6106-24-7



Sodium Tetraborate

see Sodium Borate

Sodium Thiocyanate

laboratory grade, crystal
NaSCN
F.W. 81.08

S0113 100 g $11.15

★ **HAZARD ALERT:** Moderately toxic. LD_{50} 764 mg/kg.
Storage: Inorganic #7
Disposal: #26a
Shelf Life: Hygroscopic and affected by light; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 540-72-7



Sodium Thiocyanate, Gramolpak

0.1 Molar
(as NaSCN) * S0401 pkg. $5.00

For hazard alert, storage, disposal, etc., see Sodium Thiocyanate, S0113.
*Gramolpak® is a unique package which makes 1 liter with distilled water.





Sodium Thiosulfate

hypo, pentahydrate
crystal
$Na_2S_2O_3 \cdot 5H_2O$
F.W. 248.19

Reagent	S0114	500 g	$ 7.40
	S0115	2 kg	32.95
Laboratory grade	S0116	1 kg	$ 8.80

★ **HAZARD ALERT:** Slightly toxic by ingestion; body tissue irritant. LD_{50} 2000 mg/kg.
Storage: Inorganic #2
Disposal: #12b
Shelf Life: Deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 10102-17-7



Sodium Thiosulfate

anhydrous
reagent grade, granular
$Na_2S_2O_3$
F.W. 158.11

S0322	100 g	$ 6.05
S0117	500 g	18.90

★ **HAZARD ALERT:** Slightly toxic by ingestion; body tissue irritant. LD_{50} 2000 mg/kg.
Storage: Inorganic #2
Disposal: #12b
Shelf Life: Deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 7772-98-7



Sodium Thiosulfate, Gramolpak

0.1 Molar
(as $Na_2S_2O_3$) * S0402 pkg. $4.65

For storage, disposal, etc., see Sodium Thiosulfate, S0322.
*Gramolpak® is a unique package which makes 1 liter with distilled water.





Sodium Thiosulfate Solution

0.1 Molar
(as $Na_2S_2O_3$) S0150 500 mL $5.60

Storage: Inorganic #2
Disposal: #12b
Shelf Life: Indefinite
Color: Colorless
Odor: None



Text/Lab Manual and Safety

Do not just assume that everything in a textbook or lab manual is correct or safe. This is especially true if the material is new. Assure yourself that the materials you teach from are reliable and promote good safety practices. It is your obligation as the science teacher to ensure that the information is correct. If you develop your own material you have a very special obligation for accuracy and predictability. It would be a good idea to have your material reviewed before you undertake its use.

Sodium Tungstate

reagent grade, crystal
$Na_2WO_4 \cdot 2H_2O$ **S0323** 25 g **$19.35**
F.W. 329.86

Storage: Inorganic #8
Disposal: #6
Shelf Life: Indefinite
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 10213-10-2



Spermaceti

wax, synthetic **S0324** 100 g **$15.45**
S0118 500 g **39.50**

Storage: Miscellaneous non-hazardous organic material or Organic #3.
Disposal: #26a
Shelf Life: Indefinite
Soluble: Boiling alcohol; not water.
Color: Yellow
Odor: Wax



Stains

see individual listings, e.g., Crystal Violet, Giemsa, etc.

Stannic...Tin (IV)...

Tin compounds in which the tin has an ionic charge or oxidation number of four.

Stannic Chloride

tin(IV) chloride
laboratory grade, lump
$SnCl_4 \cdot 5H_2O$ **S0226** 25 g **$ 8.70**
F.W. 350.61 **S0119** 100 g **15.90**

★ **HAZARD ALERT:** Contact with warm, moist air produces hydrochloric acid; fumes produced are severely irritating to eyes, skin and respiratory tract; moderately toxic by inhalation.
Storage: Inorganic #2 in a tightly capped bottle and then inside a Flinn *Chem-Saf*® Bag.
Disposal: #1b
Shelf Life: Poor; store in a Flinn *Chem-Saf*® Bag; moisture-sensitive.
Soluble: Cold water (decomposes in hot water); alcohol and carbon disulfide.
Color: White/yellow
Odor: None
CAS No. 10026-06-9



Stannic Chloride Solution

0.1 Molar
(as $SnCl_4 \cdot 5H_2O$ in 3M HCl)
S0375 500 mL **$12.55**

★ **HAZARD ALERT:** Corrosive to body tissue; moderately toxic by ingestion.

Continued on next column.

Working Alone

Laboratory work by science teachers should not be done at any time unless a second person is present. Working alone is hazardous. Students, of course, should **never** be allowed to do unsupervised work. Science teachers too frequently take their well-being for granted. We frequently find "prep" work being done alone by science teachers. Rarely is a form of emergency communications equipment available. We repeat: Science teachers should not do laboratory work alone.

STANNIC CHLORIDE SOLUTION *continued*

Storage: Inorganic #2
Disposal: #24b
Shelf Life: Good
Color: Colorless
Odor: None



Stannic Oxide

tin(IV) oxide
laboratory grade, powder
SnO_2 **S0325** 25 g **$10.60**
F.W. 150.70 **S0176** 100 g **25.80**

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Concentrated hydrochloric and sulfuric acid; not water.
Color: Off-white
Odor: None
CAS No. 18282-10-5



Stannous...Tin (II)...

Tin compounds in which the tin has an ionic charge or oxidation number of two.

Stannous Chloride

tin(II) chloride
laboratory grade, crystal
$SnCl_2 \cdot 2H_2O$ **S0227** 25 g **$ 7.85**
F.W. 225.65 **S0120** 100 g **15.95**
S0121 500 g **50.60**

★ **HAZARD ALERT:** Moderately toxic; skin irritant; corrosive. LD_{50} 700 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; absorbs oxygen from air and converts into an insoluble oxychloride; keep tightly closed; store in a Flinn *Chem-Saf*® Bag. Moisture-sensitive.
Soluble: Water, alkalies, tartaric acid and alcohol.
Color: White
Odor: Slight chlorine
CAS No. 10025-69-1



Stannous Chloride Solution

(as $SnCl_2 \cdot 2H_2O$ in HCl)
1 Molar **S0354** 500 mL **$14.80**
0.1 Molar **S0254** 500 mL **9.20**

★ **HAZARD ALERT:** Corrosive to body tissue; moderately toxic by ingestion.
Storage: Inorganic #2
Disposal: #24b
Shelf Life: Good
Color: Colorless
Odor: None



Starch, Corn

laboratory grade, powder
S0124 500 g **$ 7.30**
S0282 2 kg **20.35**

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite if kept dry.
Soluble: Water
Color: White
Odor: None



Starch, Potato

powder

ACS Reagent	**S0122**	100 g	**$11.45**
starch soluble for iodometry	**S0123**	500 g	**32.45**
Laboratory grade	**S0125**	500 g	**$ 7.50**

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite if kept dry.
Soluble: Water
Color: White
Odor: None



Starch, Spray

S0302 22 oz. can **$3.15**

Storage: Miscellaneous non-hazardous organic material.
Shelf Life: Indefinite
Soluble: Water
Color: White
Odor: None



Technical Note: Starch solution as an indicator for iodine can easily be made using spray starch. Generously spray the starch into the desired quantity of water and stir. Prepare as needed since starch solutions have a poor shelf life.

Starch Solution

0.5%, aqueous **S0151** 500 mL **$7.25**

Storage: Miscellaneous non-hazardous organic material.
Disposal: #26b
Shelf Life: Poor; deteriorates over time depending on storage conditions.
Color: Colorless
Odor: None



Stearic Acid

octadecanoic acid
powder
$CH_3(CH_2)_{16}COOH$
F.W. 284.49

Reagent	**S0335**	100 g	**$ 7.45**
	S0336	500 g	**15.00**
Laboratory grade	**S0356**	250 g	**$ 9.30**
	S0126	500 g	**11.65**

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Many organic solvents; not water.
Color: Off-white
Odor: Faint wax
CAS No. 57-11-4



Technical Note: Laboratory grade stearic acid is actually 50% stearic acid and 45% palmitic acid; melting point is 55–56 °C. Reagent grade is >95% stearic acid: melting point is 67–69 °C. The reagent grade is a better choice for melting point labs.

Steel, Shot

S0127 500 g **$7.60**

Storage: Inorganic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Insoluble in chemicals commonly found on school premises.
Color: Gray
Odor: None



Steel, Wool

size 00 **S0128** 454 g **$6.50**

★ **HAZARD ALERT:** Steel wood is a flammable solid. Avoid contact with flames and electricity. Steel wool may spontaneously ignite upon contact with the leads on a typical dry-cell battery.
Storage: Inorganic #1
Disposal: #26a
Shelf Life: Indefinite; will quickly oxidize if stored in a corrosive environment.
Soluble: Easily in common mineral acids.
Color: Gray
Odor: None



Technical Note: To remove protective coating, soak steel wool in acetone for a few minutes.

Streptomycin Sulfate

antibiotic

S0194 5 g **$18.15**
(Packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Moderately toxic by ingestion; body tissue irritant and possible sensitizer. LD_{50} 500 mg/kg.
Storage: Organic #2
Disposal: #26a
Shelf Life: Fair to poor; substance deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; almost insoluble in alcohol.
Color: Light gray
Odor: Faint amine



Strontium Bromide

reagent grade, crystal
$SrBr_2 \cdot 6H_2O$ **S0376** 25 g **$9.75**
F.W. 355.52

★ **HAZARD ALERT:** Slightly toxic by ingestion and inhalation.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Poor; deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 7789-53-9



Strontium Bromide Solution

0.1 Molar
(as $SrBr_2 \cdot 6H_2O$) **S0377** 500 mL **$8.75**

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Flaming Splints

Many experiments call for tests of gases with flaming splints. Flashbacks can occur with dangerous results. The flaming splint should be held so that neither the mouth nor the bottom of the test tube is pointed at the student. Stress this point with your students repeatedly.

Strontium Chloride

crystal
$SrCl_2 \cdot 6H_2O$
F.W. 266.64

Reagent	**S0357**	25 g	**$ 4.60**
	S0129	100 g	**9.50**
	S0130	500 g	**27.95**
Laboratory grade	**S0440**	100 g	**$ 6.90**
	S0441	500 g	**21.90**

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Fair to poor; effloresces in air; deliquesces in moist air; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 10025-70-4



Strontium Chloride, Gramolpak

0.25 Molar
(as $SrCl_2 \cdot 6H_2O$) * **S0403** pkg. **$5.15**

For storage, disposal, etc., see Strontium Chloride, S0357.
*Gramolpak® is a unique package which makes 500 mL with distilled water.



Strontium Chloride Solution

(as $SrCl_2 \cdot 6H_2O$)

1 Molar	**S0358**	500 mL	**$15.50**
0.1 Molar	**S0255**	500 mL	**5.95**

For storage, disposal, etc., see Strontium Chloride, S0357.
Color: Colorless
Odor: None



Strontium Hydroxide

laboratory grade, crystal
$Sr(OH)_2 \cdot 8H_2O$ **S0378** 25 g **$9.10**
F.W. 266.82

★ **HAZARD ALERT:** The aqueous solution is very alkaline; corrosive to body tissues.
Storage: Inorganic #4
Disposal: #10
Shelf Life: Poor; deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Hot water
Color: White
Odor: None
CAS No. 1311-10-0



Strontium Hydroxide Solution

Saturated
(as $Sr(OH)_2 \cdot 8H_2O$) **S0379** 100 mL **$9.30**

★ **HAZARD ALERT:** Very alkaline solution; severe body tissue irritant.
Storage: Inorganic #4

Continued on next column.

Mercury Thermometers

A broken mercury thermometer spills the mercury into the lab benchtop cracks, crevices under the lab benches, floor cracks and other inaccessible areas. While you may successfully pick up most of the droplets, nevertheless, some remain. This toxic substance will slowly vaporize into the room environment. The students come and go, but the science teacher remains exposed to the cumulative effects of mercury.

STRONTIUM HYDROXIDE SOLUTION *continued*

Disposal: #10
Shelf Life: Good
Color: Colorless
Odor: None



Strontium Nitrate

crystal
$Sr(NO_3)_2$
F.W. 211.63

Reagent	**S0131**	100 g	**$10.51**
	S0132	500 g	**27.81**
Laboratory grade	**S0442**	100 g	**$ 9.41**
	S0443	500 g	**19.91**

★ **HAZARD ALERT:** Strong oxidant; fire risk in contact with organic material; slightly toxic. Possible body tissue irritant. LD_{50} 2750 mg/kg.
Storage: Inorganic #3
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water; slightly in absolute alcohol.
Color: White
Odor: None
CAS No. 10042-76-9



Strontium Nitrate, Gramolpak

0.5 Molar
(as $Sr(NO_3)_2$) * **S0404** pkg. **$8.65**

For hazard alert, storage, disposal, etc., see Strontium Nitrate, S0131.
*Gramolpak® is a unique package which makes 250 mL with distilled water.



Strontium Nitrate Solution

(as $Sr(NO_3)_2$)

1 Molar	**S0359**	500 mL	**$11.45**
0.1 Molar	**S0256**	500 mL	**6.35**

For hazard alert, storage, disposal, etc., see Strontium Nitrate, S0131.
Color: Colorless
Odor: None



Styrene, Monomer

laboratory grade
$C_6H_5CH=CH_2$ **S0338** 100 g **$11.81**
F.W. 104.15

★ **HAZARD ALERT:** Slightly toxic by ingestion and inhalation; *possible carcinogen*; flammable liquid. TLV 213 mg/m^3. LD_{50} 5000 mg/kg.
Storage: Organic #3 in a flammables cabinet.
Disposal: #18b
Shelf Life: Fair to poor.
Soluble: Alcohol; ether; not water.
Color: Colorless
Odor: Aromatic, rubber cement-like.
CAS No. 100-42-5



Succinic Acid

butanedioic acid
laboratory grade, powder
$(CH_2COOH)_2$ **S0133** 100 g **$15.75**
F.W. 118.09

★ **HAZARD ALERT:** Slightly toxic by ingestion. LD_{50} 2260 mg/kg.
Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Alcohol; slightly in water.
Color: White
Odor: None
CAS No. 110-15-6



Sucrose

crystal
$C_{12}H_{22}O_{11}$
F.W. 342.31

Reagent	**S0134**	500 g	**$11.15**
	S0283	2 kg	**22.95**
Laboratory grade	**S0135**	1 kg	**$ 9.65**
cane sugar, white	**S0136**	2 kg	**12.95**

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; slightly in alcohol.
Color: White
Odor: Malt-like
CAS No. 57-50-1
Technical Note: Not for human consumption.



Sucrose

brown cane sugar **S0166** 500 g **$3.00**

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; slightly in alcohol.
Color: Brown
Odor: Slight malt
Technical Note: Not for human consumption.



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www.flinnsci.com

Sudan III

biological stain
$C_{22}H_{16}N_4O$ **S0152** 5 g **$8.50**
F.W. 352.40

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Alcohol; not water.
Color: Rose
Odor: None
CAS No. 85-86-9
C.I. #26100



Sudan III Solution

0.5%, alcoholic staining solution
S0159 100 mL **$6.10**

★ **HAZARD ALERT:** Alcohol-based solution; flammable liquid; toxic by ingestion and inhalation.
Storage: Organic #9 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #26b
Shelf Life: Good if stored safely.
Color: Red
Odor: Alcohol



Sudan IV

biological stain **S0153** 5 g **$7.25**

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Alcohol; not water.
Color: Brown
Odor: None
CAS No. 85-83-6
C.I. #26105



Sudan IV Solution

0.5%, alcoholic staining solution
S0160 100 mL **$7.95**

★ **HAZARD ALERT:** Alcohol-based solution; flammable liquid; moderately toxic.
Storage: Organic #9 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Good if stored safely.
Color: Red
Odor: Alcohol



Sugar, White Cane

see Sucrose, laboratory grade

Sugar, Brown

see Sucrose (brown cane sugar)

Sulfamic Acid

laboratory grade, crystal
H_2NSO_3H **S0381** 50 g **$7.50**
F.W. 97.09

★ **HAZARD ALERT:** Slightly toxic by ingestion; corrosive to body tissues. LD_{50} 3160 mg/kg.
Storage: Inorganic #9
Disposal: #18b
Shelf Life: Poor, keep dry; hydrolyzes.
Soluble: Water, slightly in alcohol and acetone; insoluble in ether.
Color: White
Odor: None
CAS No. 5329-14-6



Sulfanilamide

laboratory grade, crystal
$H_2NC_6H_4SO_2NH_2$ **S0257** 25 g **$8.95**
F.W. 172.21

★ **HAZARD ALERT:** Slightly toxic by ingestion. LD_{50} 3900 mg/kg.
Storage: Inorganic #3
Disposal: #20
Shelf Life: Indefinite
Color: White
Odor: None
CAS No. 63-74-1



Sulfanilic Acid

4-aminobenzene sulfonic acid
laboratory grade, powder

$NH_2C_6H_4SO_3H \bullet H_2O$	**S0432**	10 g	**$ 7.20**
F.W. 173.19	**S0137**	100 g	**36.00**

Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Slowly in water; almost insoluble in cold organic solvents.
Color: White
Odor: None
CAS No. 121-57-3



When Should I Discuss Laboratory Safety?

Every day! Yes, make safety a part of every lecture, every lab, and every chemical demonstration. Review one aspect of the safety contract for one minute every day or discuss the safety procedures of a lab or the chemical demonstration. Make safety a part of your class lesson plan every day.

5-Sulfosalicylic Acid

reagent for albumin in urine and as colorimetric reagent for ferric ion
laboratory grade, crystal
$C_6H_3OH(SO_3H)CO_2H \bullet 2H_2O$
F.W. 254.22

S0327	25 g	**$17.80**
	(Packaged in PVC-coated bottles)	

★ **HAZARD ALERT:** Irritating to skin and mucous membranes. LD_{50} 2450 mg/kg.
Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite, but light-sensitive.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 5965-83-3



Sulfur, Flowers

laboratory grade, powder
sublimed
S
A.W. 32.066

S0138	500 g	**$ 6.51**
S0139	2 kg	**15.31**

★ **HAZARD ALERT:** This finely divided form of sulfur can be a moderate fire or explosion risk. Sulfur has low toxicity. When sulfur is burned, toxic sulfur dioxide is produced. May be skin irritant. LD_{50} 5000 mg/kg.
Storage: Inorganic #10
Disposal: #26a
Shelf Life: Indefinite
Soluble: Slightly in alcohol and other organic solvents; insoluble in water.
Color: Yellow
Odor: Faint rotten eggs
CAS No. 7704-34-9



Sulfur, Roll

laboratory grade, flake
S
A.W. 32.066

S0140	500 g	**$ 5.41**
S0141	2 kg	**14.41**

★ **HAZARD ALERT:** Dust or finely divided material in the container can be a moderate fire risk. When sulfur is burned, toxic sulfur dioxide is produced. Sulfur has low toxicity. May be skin irritant. LD_{50} 5000 mg/kg.
Storage: Inorganic #10
Disposal: #26a

Continued on next column.

SULFUR, ROLL *continued*

Shelf Life: Indefinite
Soluble: Slightly in alcohol and other organic solvents; insoluble in water.
Color: Yellow
Odor: Faint rotten eggs
CAS No. 7704-34-9





Forms of Sulfur S0142, S0138, S0140

Sulfur, Precipitated

lac sulfur
laboratory grade, powder
S
A.W. 32.066

S0142	500 g	**$ 7.51**
S0155	2 kg	**21.41**

★ **HAZARD ALERT:** This finely divided form of sulfur can be a moderate fire or explosion risk. Sulfur has low toxicity. When sulfur is burned, toxic sulfur dioxide is produced. May be skin irritant. LD_{50} 5000 mg/kg.
Storage: Inorganic #10
Disposal: #26a
Shelf Life: Indefinite
Soluble: Slightly in alcohol and other organic solvents; insoluble in water.
Color: Yellow
Odor: Faint rotten eggs
CAS No. 7704-34-9



Flinn Acids:
The Safer Choice

Sulfuric acid is an essential part of any chemical laboratory but is also one of the more hazardous. Flinn makes it safer by providing PVC-coated bottles, Flinn *Saf-Cube*®, and premixed solutions.

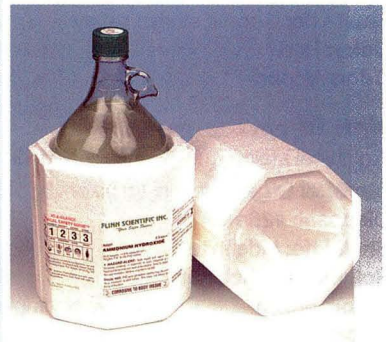


Safer Bottles: Please order the 2.5 L sulfuric acid in the *Plas-Pak*® bottle (S0145). These PVC-coated bottles are lifesavers!

***Saf-Cube*®:** All 18 M sulfuric acid bottles are shipped in Flinn *Saf-Cubes* for your protection. Don't throw these valuable containers away. They make great storage containers if no acid cabinet is available.

Premixed Solutions: Consider buying Flinn premixed sulfuric acid solutions. They save time and are safer to store than concentrated acids. If you make your own solutions…

Always Add Acid to Water!



Sulfur Hexafluoride Gas

lecture bottle	**LB1030**	0.5 lb (37 liters)	**$174.81**

★ **HAZARD ALERT:** May react violently with organometallics and chemically-active metals. Reacts vigorously, perhaps explosively, with disilane.

Storage: In an area dedicated to bottled gases.

Disposal: Completely empty lecture bottle in a good operating fume hood then follow #26a.

Shelf Life: Indefinite if stored safely.

Soluble: Alcohol; slightly in water.

Color: None

Odor: None

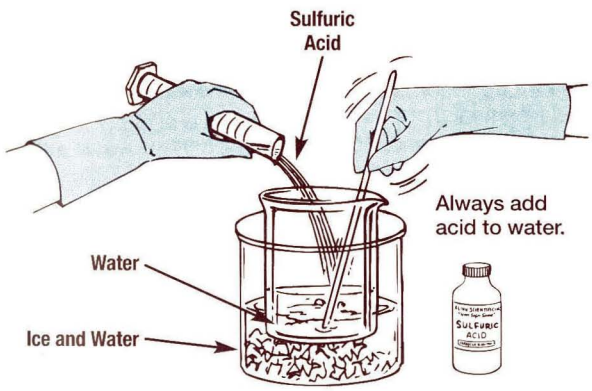
CAS No. 2551-62-4



Special Note: Sulfur hexafluoride lecture bottle is color-coded with the top half green and the bottom half brown.

Preparing Sulfuric Acid Solution?

Always **ADD ACID (AA)** to water! A great amount of heat is liberated when sulfuric acid is added to water. The temperature of the solution will rise rapidly. In fact, the temperature may rise so fast that the solution will boil and possibly spatter a strongly acidic solution. Consider immersing your mixing vessel in a bucket of ice to control the solution temperature. Always add the acid to water **very** slowly while stirring continuously.



Sulfuric Acid

18 Molar

ACS, reagent
H_2SO_4
F.W. 98.08

	S0228	100 mL	**$ 6.51**
	(Packaged in PVC-coated bottle)		
	S0143	500 mL	**13.01**
	S0144	2.5 liters	**24.61**
*	**S0145**	2.5 liters	**26.91**
	(5-pt PVC-coated bottle)		

★ **HAZARD ALERT:** *Severely corrosive* to eyes, skin and other tissue; considerable heat of dilution with water; mixing with water may cause spraying and spattering. Solutions might best be made by immersing the mixing vessel in an ice bath. Even very dilute solutions are harmful to eyes and skin. **Always add the acid to water, never the reverse;** extremely hazardous in contact with finely divided materials, carbides, chlorates, nitrates and other combustible materials. TLV 1 mg/m^3.

Storage: Inorganic #9 in a dedicated acid cabinet and away from any source of water; if an acid cabinet is not available, store in a Flinn *Saf-Cube*®.

Disposal: #24b

Shelf Life: Good, but only if stored away from water and under safe conditions. Sulfuric acid has an affinity to water—abstracting it from the air and from organic substances, hence it chars wood, sugar, etc. If sulfuric acid has turned dark brown on your shelf its purity would be in question.

Continued on next column.

SULFURIC ACID *continued*

Soluble: Water, evolving very considerable heat. Use an ice bath.

Color: Colorless

Odor: Sulfur; sulfurous.

CAS No. 7664-93-9



Cap Safety Color Code: Yellow

Technical Note: Spilled sulfuric acid presents a very slippery floor problem. We hope you understand why it is essential to maintain a bucket of dry sand in the area where sulfuric acid is stored.

Safety Purchase Suggestion: Buy and store only small package sizes and small quantities. For safety reasons, Flinn offers larger sizes of sulfuric acid and other hazardous substances in PVC-coated bottles. We have attempted to price the products in these safer containers as low as possible.

* Sulfuric acid is exactly as described under catalog number S0144 but in a PVC-coated bottle. In the event of breakage, acid and glass shards are safely retained in a PVC outer envelope. *Plas-Pak*® is a safer package for science teachers.

Sulfuric Acid Solution

(as H_2SO_4)

12.5 Molar*	**S0380**	500 mL	**$13.11**
	S0406	liter	**19.91**
9 Molar*	**S0413**	500 mL	**$13.11**
	S0414	liter	**19.01**
6 Molar**	**S0415**	500 mL	**$11.71**
	S0416	liter	**18.21**
5 Molar†	**S0208**	500 mL	**$11.31**
	S0209	liter	**15.61**
3 Molar**	**S0417**	500 mL	**$ 9.20**
	S0418	liter	**14.80**
2 Molar†	**S0204**	500 mL	**$ 9.30**
	S0205	liter	**12.10**
1 Molar‡	**S0202**	500 mL	**$ 8.90**
	S0203	liter	**11.90**
0.5 Molar§	**S0161**	500 mL	**$ 6.40**
	S0162	liter	**10.75**
0.1 Molar‡	**S0419**	500 mL	**$ 7.75**
	S0420	liter	**9.35**
0.05 Molar§	**S0154**	500 mL	**$ 8.00**
	S0421	liter	**11.15**

★ **HAZARD ALERT:** Treat all sulfuric acid solutions with the same caution you would have for concentrated sulfuric acid. For example, the pH of 0.05 M sulfuric acid solution is 1.2.

Storage: Inorganic #9; preferably in a dedicated acid cabinet.

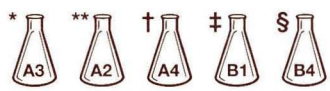
Disposal: #24b

Shelf Life: Indefinite

Soluble: Water

Color: Colorless

Odor: None



Sulfuric Acid = Slippery Floor

A sulfuric acid spill on the floor will convert that floor into an oily skating rink. If you usually don't buy PVC-coated (plastic-coated) acid bottles, at least buy your sulfuric acid in PVC-coated bottles. If acids are used, then five-gallon pails of dry sand are required as well. The clean, dry sand will provide floor traction and can be used to dike the spill.

T

Talc

talcum, hydrous magnesium silicate
laboratory grade, powder
$3MgO \cdot 4SiO_2 \cdot H_2O$ **T0001** 500 g **$9.25**

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Not soluble in water or alcohol.
Color: Off-white
Odor: None
CAS No. 14807-96-6



Tallow

for soap-making experiments
T0084 100 g **$5.90**

Storage: Organic #3
Disposal: #26a
Shelf Life: Poor
Soluble: Organic solvents
Color: White
Odor: Beef stock



Tannic Acid

laboratory grade, powder
$C_{76}H_{52}O_{46}$
F.W. 1701.18 **T0002** 100 g **$13.75**
(Packaged in PVC-coated bottle)

★ **HAZARD ALERT:** Slightly toxic by ingestion and inhalation; possible allergen. LD_{50} 2260 mg/kg.
Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite; substance color darkens on exposure to air.
Soluble: Water, alcohol and acetone.
Color: Tan/yellow
Odor: Slight cucumber
CAS No. 1401-55-4



L-Tartaric Acid

laboratory grade, crystal
$HO_2CCH(OH)CH(OH)CO_2H$
F.W. 150.09 **T0054** 100 g **$ 9.45**
T0003 500 g **19.90**

Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Off-white
Odor: Slight malt
CAS No. 87-69-4



Tes-Tape

see Glucose Test Strips

Thermit Reactions

Thermit reactions sometimes seem difficult to start. Using igniting sticks or magnesium metal ribbon as a fuse for starting is a very common practice. We are talking major heat levels here, and lots of sputtering and spattering. This demonstration is done from behind a shield and in a container that can tolerate the heat, like a porcelain crucible. There is enough heat generated in this reaction to melt steel. In fact, one of the commercial applications for thermit is metal welding. Practice this demonstration before ever showing it to your students.

Test Papers (litmus, etc.)

see pages 298–302

Testosterone, Testosterone Propionate

No longer available. The Food and Drug Administration (FDA) has regulated these substances due to steroid abuse. A license is now required to sell and purchase them.

Tetrachloroethylene

see Perchloroethylene

Tetracycline Hydrochloride

antibiotic **T0041** 25 g **$33.80**

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Dilute hydrochloric acid; only slightly in water or alcohol.
Color: Yellow
Odor: None
CAS No. 64-75-5



Tetrahydrofuran

THF
C_4H_8O **T0066** 100 mL **$14.41**
F.W. 72.11

★ **HAZARD ALERT:** Slightly toxic by ingestion and inhalation; flammable liquid; dangerous fire risk. Body tissue irritant. May possibly develop explosive peroxides. Do not distill to dryness. LD_{50} 2500 mg/kg.
Storage: Organic #4 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #15
Shelf Life: Poor; see hazard alert above regarding peroxide development.
Soluble: Water and most organic solvents
Color: Colorless
Odor: Ether-like
CAS No. 109-99-9



Tetramethyl-p-phenylenediamine, Dihydrochloride



N,N,N′,N′-tetramethyl-1, 4-benzenediamine dihydrochloride
"Wurster's Reagent" for oxidase enzyme determination
crystalline powder
$C_{10}H_{16}N_2 \cdot 2HCl$ **T0092** 1 g **$26.80**
F.W. 237.2

★ **HAZARD ALERT:** Eye and skin irritant. May be harmful by inhalation, ingestion, or skin absorption.
Storage: Organic #2
Disposal: #5
Shelf Life: Poor; store in a cool, dry place in a tightly closed container.
Soluble: Water
Color: White, pink or tan
Odor: Slight alcohol odor, like a doctor's office.
CAS No. 637-01-4



Tetrazolium Chloride

see Triphenyl Tetrazolium Chloride

Thermit

black **T0007** 500 g **$10.45**

★ **HAZARD ALERT:** When ignited, produces an extremely hot (>2000 °C) reaction mixture that will throw sparks 10–15 feet and is difficult to stop. Wear face, hand and eye protection and use a safety shield when performing demonstration.
Storage: Inorganic #4 inside a Flinn *Saf-Stor*® Can and then in a dedicated flammables cabinet.

THERMIT continued on next page.

THERMIT *continued*

Disposal: #26a
Shelf Life: Good if stored safely.
Color: White/gray/black
Odor: None
CAS No. 69012-31-3



Technical Note: Thermit is a mixture of ferric oxide and very fine aluminum powder. The thermit reaction requires a temperature of almost 1200 °C for ignition, and is best performed using specially designed igniting sticks (see next listing, T0086).

Thermit, Igniting Sticks

T0086	pkg./10	**$16.71**

★ HAZARD ALERT: Thermit igniting sticks are a fire hazard when exposed to a flame or temperatures above 500 °F. Contact us for a technical data sheet relating to their use.
Storage: Inorganic #1 in a dedicated flammables cabinet.
Disposal: #26a
Shelf Life: Indefinite if kept dry.
Color: Silver gray metal on a copper stick.
Odor: None



Safety Purchase Suggestion: These igniting sticks are the easiest and safest method for starting thermit reactions. Please consider using them instead of magnesium metal ribbon or other chemical ignitors.

Thiamine Hydrochloride

vitamin B_1, powder

T0029	25 g	**$25.25**

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: White
Odor: Vitamin-like
CAS No. 59-43-8



Thioacetamide

laboratory grade, crystal
CH_3CSNH_2
F.W. 75.14

T0009	10 g	**$10.45**
T0010	25 g	**16.50**
T0011	100 g	**46.30**

★ HAZARD ALERT: Moderately toxic by ingestion and inhalation; *possible carcinogen.* LD_{50} 301 mg/kg.
Storage: Organic #2
Disposal: #13
Shelf Life: Indefinite
Soluble: Water, alcohol and other organic solvents
Color: White
Odor: Buttered popcorn
CAS No. 62-55-5



Technical Note: This reagent is used in qualitative analysis schemes to replace hydrogen sulfide gas. For an alternative method of generating H_2S, see our listings for "Aitch-Tu-Ess" (Flinn Catalog Nos. A0173 and A0232).

Thioacetamide Solution

1 Molar	**T0083**	25 mL	**$ 6.85**
(as CH_3CSNH_2)	**T0082**	100 mL	**13.25**

★ HAZARD ALERT: Moderately toxic by ingestion; *possible carcinogen.*
For storage, disposal, etc., see Thioacetamide, T0009.



Thiocarbamide

see Thiourea

Thioglycolate Medium



dehydrated bacteriological medium, powder

T0093	100 g	**$24.50**

★ HAZARD ALERT: Irritating to lungs and respiratory tract.
Storage: Organic miscellaneous
Disposal: #26a
Shelf Life: Good, if stored in a cool, dry place. Keep container tightly sealed.
Soluble: Water
Color: Light beige
Odor: Strong putrid odor



Technical Note: Contains an indicator to detect oxygen levels. To prepare medium for bacteriological growth, add 29.8 g of product to one liter of distilled or deionized water. Sterilize before use.

Thionin

biological stain

T0077	2.5 g	**$23.95**
T0043	5 g	**42.30**

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Hot water
Color: Black
Odor: Slight vinegar
CAS No. 78338-22-4
C.I. #52000



Thionin Solution

Saturated
aqueous

T0044	100 mL	**$18.05**

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Purple/black
Odor: None



Thiourea

thiocarbamide
reagent grade, crystal
NH_2CSNH_2
F.W. 76.12

T0012	100 g	**$11.50**

★ HAZARD ALERT: *Possible carcinogen;* highly toxic; mild body tissue irritant. LD_{50} 125 mg/kg.
Storage: Organic #2 in a Flinn *Chem-Saf*® Bag in a locked poisons cabinet.
Disposal: #13
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 62-56-6



Technical Note: Reagent sometimes used for bismuth and selenite ions. This material should be used with great care and only under the science instructor's close supervision.

A Fume Hood's Role

A fume hood should capture, dilute (with air), and exhaust hazardous substances for your protection. Hoods are **not** storage cabinets. Hoods are **not** a room air evacuation system. Your health and that of your students benefit by doing as much of your lab work under a hood as possible. Unfortunately, many schools don't have hoods. It is analogous to playing football without protective pads—it isn't done, is it? Educate your principal about why hoods are essential for safe science instruction.

Thymol

laboratory grade, crystal
$CH_3(C_3H_7)C_6H_3OH$
F.W. 150.11
M.P. 50 °C

T0078	25 g	$ 6.45
T0030	100 g	14.65

(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Skin and respiratory tract irritant; moderately toxic. LD_{50} 980 mg/kg.
Storage: Organic #8
Disposal: #24a
Shelf Life: Indefinite
Soluble: Alcohol and acetic acid; slightly in water.
Color: Colorless
Odor: Liniment-like
CAS No. 89-83-8
Technical Note: Melting point 50 °C.



Thymol Blue

indicator, sodium salt
pH 1.2 red to 2.8 yellow and 8.0 yellow to 9.2 blue
reagent grade, crystal
$C_{27}H_{29}NaO_5S$
F.W. 488.58

T0025	1 g	$7.70

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Alcohol and acetic acid; water.
Color: Black
Odor: None
CAS No. 62625-21-2



Thymol Blue Indicator Solution

0.04%, aqueous

T0045	100 mL	$7.10

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Dark blue
Odor: None



Thymolphthalein

indicator
pH 9.3 colorless to 10.5 blue
reagent grade, powder
$C_{28}H_{30}O_4$
F.W. 430.52

T0072	1 g	$ 5.80
T0073	5 g	12.90

Storage: Organic #9
Disposal: #18b
Shelf Life: Indefinite
Soluble: Alcohol and acetone; not water.
Color: White
Odor: None
CAS No. 125-20-2



Bottle Labels

If the task of labeling a bottle of chemical falls to you, then please take the extra few minutes to prepare a complete label. Apply the label in as permanent a manner as possible and apply some form of protection over the label. Why? The "quick and dirty" label job today is next year's mystery substance. A great and practical policy is to eliminate a substance or solution from your shelves unless you expect to use the material in the next school year. Do not store what you do not need!

Thymolphthalein Indicator Solution

0.04%, alcoholic

T0079	100 mL	$ 5.20
T0080	500 mL	13.50

★ **HAZARD ALERT:** Alcohol solution; flammable liquid.
For storage, disposal, etc., see Thymolphthalein, T0072.
Color: Colorless
Odor: Alcohol



L-Thyroxine

thyroid hormone
sodium salt
$C_{15}H_{10}I_4NNaO_4 \bullet 5H_2O$
F.W. 888.95

T0031	250 mg	$21.10
T0032	500 mg	32.65

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Practically insoluble in water (15 mg/100 mL). Soluble in mineral acids and in solutions of alkali hydroxides and carbonates. More soluble in alcohol.
Color: White
Odor: None
CAS No. 6106-07-6



Tin

granular
20 mesh
Sn
A.W. 118.69

Reagent	T0055	25 g	$ 9.45
	T0013	100 g	19.95
	T0063	500 g	64.95
Laboratory grade	T0090	100 g	$15.90

Storage: Inorganic #1
Disposal: #27a
Shelf Life: Indefinite
Soluble: Not water; acids and hot potassium hydroxide solution.
Color: Shiny gray
Odor: None
CAS No. 7440-31-5



Tin, Foil

.0015 thick
12″ wide
Sn

T0058	25 g	$ 8.20
T0064	100 g	18.10
T0017	500 g	43.95

For storage, disposal, etc., see Tin, granular, T0055.



Tin, Mossy

Sn

T0056	25 g	$14.20
T0014	100 g	14.95
T0015	500 g	69.90

For storage, disposal, etc., see Tin, granular, T0055.



Tin, Sheet

Sn, 1/32″ thick

T0089	$18.15
12″ × 4″, approx. 125 g	
T0088	46.45
12″ × 12″, approx. 500 g	

For storage, disposal, etc., see Tin, granular, T0055.



Tin, Shot

Sn

T0057	25 g	$12.15
T0016	100 g	23.90

For storage, disposal, etc., see Tin, granular, T0055.



Tin, Strips

Sn, 1/32″ thick
6″ long × ½″ wide — T0087 — pkg./6 — $5.40

For storage, disposal, etc., see Tin, granular, T0055.



Tin Compounds

see Stannic and Stannous compounds

Titanium Dioxide

titanium (IV) oxide
laboratory grade, powder
TiO_2
F.W. 79.90

T0081 — 100 g — $ 8.65
T0018 — 500 g — 25.05

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Insoluble in water and most common solvents; soluble in hot sulfuric acid.
Color: White
Odor: None
CAS No. 13463-67-7



Toluene

toluol
reagent grade
$C_6H_5CH_3$
F.W. 92.14

T0019 — 500 mL — $ 5.95
T0020 — 4 liters — 29.61

★ **HAZARD ALERT:** Moderately toxic by ingestion, inhalation and skin absorption; flammable liquid; dangerous fire risk. Possible skin irritant. LD_{50} 636 mg/kg. TLV 377 mg/m^3.
Storage: Organic #3 in a dedicated flammables cabinet. If one is not available, store in a Flinn*Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Good if stored safely.
Soluble: Alcohol; not water.
Color: Colorless
Odor: Benzene-like
CAS No. 108-88-3



Toluidine Blue O

basic blue 17
biological stain

T0067 — 1 g — $10.80
T0050 — 10 g — 28.00

★ **HAZARD ALERT:** Moderately toxic by ingestion.
Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Dark green
Odor: None
CAS No. 92-31-9
C.I. #52040



Toluidine Blue O Solution

1%, aqueous

T0048 — 100 mL — $ 9.85
T0049 — 500 mL — 31.05

Storage: Organic #9
Disposal: #26b
Shelf Life: Indefinite
Color: Dark blue
Odor: None



TOP

see 4-(t-Octyl) Phenol on page 128

Tricaine Methanesulfonate

ethyl 3-aminobenzoate, methanesulfonic acid salt
$C_{10}H_{15}NO_5S$
F.W. 261.31

T0033 — 5 g — $19.10

Storage: Organic #1
Disposal: #24a
Shelf Life: Indefinite
Soluble: Water
Color: White
Odor: None
CAS No. 886-86-2
Technical Note: Anesthetic and tranquilizer for cold-blooded animals and fish.



Trichloroacetic Acid

reagent grade, crystal
CCl_3COOH
F.W. 163.40

T0059 — 25 g — $11.40
T0021 — 100 g — 30.30

★ **HAZARD ALERT:** Moderately toxic by ingestion and inhalation; corrosive to body tissue. LD_{50} 400 mg/kg. TLV 7 mg/m^3.
Storage: Organic #1. Vent product under a hood as you open the bottle. Decomposition products are chloroform, hydrochloric acid, carbon dioxide and carbon monoxide.
Disposal: #24a
Shelf Life: Poor; product very deliquescent; keep tightly closed and store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White
Odor: Vinegar-like
CAS No. 76-03-9



1,1,1-Trichloroethane

No longer available. 1,1,1-Trichloroethane, along with other halogenated hydrocarbons, is being phased out as a result of the Montreal Protocol.

For the halogen experiment, science teachers tell us hexanes works very well.

Trichloroethylene

laboratory grade
ClCH:CCl_2
F.W. 131.39

T0037 — 500 mL — $18.25

★ **HAZARD ALERT:** Vapor harmful to eyes, skin and lungs; inhalation of vapor may cause headache; nausea or disorientation. Incompatible with alkali metals and aluminum. *Probable carcinogen.* LD_{50} 2402 mg/kg. TLV 269 mg/m^3.
Storage: Organic #4
Disposal: #27j
Shelf Life: Indefinite
Soluble: Miscible with many organic solvents; not soluble in water.
Color: Colorless
Odor: Chloroform-like
CAS No. 79-01-6



Flammable Organic Liquids: Did You Know?

Many organic compounds are characterized as flammable even though the liquid itself will not burn. The vapor will burn. It is the combination of the creation of vapor and the addition of air that causes the substance to be flammable. You can conclude why cool storage of most organic liquids will lower your risk. Keep chemical storerooms cool and well ventilated.

1,1,2-Trichlorotrifluoroethane

No longer available. 1,1,2-Trichlorotrifluoroethane, along with other halogenated hydrocarbons, is being phased out as a result of the Montreal Protocol.

For the halogen experiment, science teachers tell us hexanes works very well.

Triethanolamine

2,2′,2″-nitrilotriethanol
laboratory grade
$N(CH_2CH_2OH)_3$
F.W. 149.19

T0069	100 mL	$10.45
T0039	500 mL	38.75

Storage: Organic #2
Disposal: #18b
Shelf Life: Indefinite
Soluble: Miscible with water and alcohol; soluble in chloroform.
Color: Colorless
Odor: None
CAS No. 102-71-6



Technical Note: Melting point is 21 °C; this substance may be a solid at room temperature.

1,2,3-Triketohydrindene Hydrate

see Ninhydrin

Triphenyl Tetrazolium Chloride

tetrazolium chloride
germination indicator
$C_{19}H_{15}ClN_4$
F.W. 334.82

T0027	5 g	$18.50
T0028	25 g	58.05

Storage: Organic #9
Disposal: #8
Shelf Life: Turns yellow on exposure to light—otherwise indefinite.
Soluble: Water and alcohol
Color: Off-white
Odor: Unsalted butter
CAS No. 298-96-4



Tris-Acetate Buffer

pH 7.8 buffer for electrophoresis
50X buffer concentrate
100 mL of concentrate is enough to make 5 L of buffer solution

FB0325	100 mL	$20.40

Tris-Glycine Buffer

This buffer stores poorly so you would be wise to make it on an "as needed" basis. To 1 liter of distilled water add 0.4 grams of tris(hydroxymethyl) aminomethane (THAM) (Flinn Catalog No. T0070) and 2.8 grams of glycine (Flinn Catalog No. G0035). Now check pH. Final pH should be 8.6.

Tris(hydroxymethyl)aminomethane

TRIS, THAM
biochemical buffer for electrophoresis
laboratory grade, crystal
$H_2NC(CH_2OH)_3$
F.W. 121.14

T0070	25 g	$10.45
T0053	100 g	30.05

Continued on next column.

What Are Laboratory Grade Chemicals?

Every chemical Flinn Scientific sells is suitable for high school science laboratories. Laboratory grade chemicals are high quality chemicals that meet industry standards but have not gone through the rigorous testing that reagent chemicals do. Some chemical demonstrations, quantitative analysis labs, and AP labs demand higher quality, reagent chemicals. But for most of your laboratory needs, Flinn laboratory grade chemicals provide the best quality and value.

TRIS(HYDROXYMETHYL)AMINOMETHANE *continued*

Storage: Organic #2
Disposal: #26a
Shelf Life: Poor; hygroscopic.
Soluble: Freely in alcohol; slightly in water.
Color: White
Odor: None
CAS No. 77-86-1



Trypsin

powder, from pig pancreas
enzyme of the pancreatic juice
1:250 (≥ 250,000 USP units/gram)

T0071	5 g	$15.35
T0035	25 g	63.10

Storage: Organic #2
Disposal: #26a
Shelf Life: Poor; refrigerate.
Soluble: Water; not alcohol.
Color: White
Odor: Sour, dry urine
CAS No. 9002-07-7



Tryptic Soy Agar

culture media, prepared

T0076	pkg./ 6 tubes	$12.50

Storage: Miscellaneous organic.
Disposal: #26a
Shelf Life: Fair to poor.
Color: Buff
Odor: None



Tryptone

bacteriological media

T0026	100 g	$33.15

Storage: With miscellaneous non-hazardous organic material.
Disposal: #26a
Shelf Life: Indefinite if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: White
Odor: Malt



Turpentine

pure gum spirits

T0024	500 mL	$8.40

★ **HAZARD ALERT:** Slightly toxic; irritating to skin and mucous membranes. TLV 556 mg/m^3.
Storage: Organic #3
Disposal: #18b
Shelf Life: Indefinite
Soluble: Alcohol, acetic acid and chloroform; insoluble in water.
Color: Buff
Odor: Paint thinner
CAS No. 8006-64-2



L-Tyrosine



4-hydroxyphenylalanine
amino acid, powder
$HOC_6H_4CH_2CH(NH_2)CO_2H$
F.W. 181.19

T0091	5 g	$13.25

Storage: Organic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Soluble in dilute aqueous alkali; slightly in water.
Color: White
Odor: None
CAS No. 60-18-4



U

Universal Indicator Solution

pH 4–10
color indicator chart is attached to the bottle

*	U0009	35 mL	$ 5.35
	U0001	100 mL	7.10
	U0002	500 mL	12.85
	U0011	1000 mL	22.95

★ HAZARD ALERT: Alcohol-based solution; flammable liquid.
Storage: Organic #9 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #26b
Shelf Life: Indefinite
Color: Dark green
Odor: Slight alcohol



*Special and unique dropping bottle package called a Flinn *E-Z Drop*®.

Universal Indicator Solution, Color Chart

pH range 4–10, 4-color chart

Package of 30 charts	AP8765	pkg.	$5.05
2.75 × 3.5 in.			
Overhead color chart	AP5367	ea.	$8.25
8.5 × 11 in.			

Universal Indicator Solution, Rainbow Acid

pH 1–7
color indicator chart attached to the bottle

	U0012	100 mL	$7.60

Storage: Organic #9 in a dedicated flammables cabinet.
Disposal: #26b
Shelf Life: Indefinite
Color: Dark green



Technical Note: Rainbow spectrum of colors observed for pH values from 1–7. Excellent indicator to test acidity levels of common household substances.

Uranin

see Fluorescein

Uranyl Nitrate

$UO_2(NO_3)_2 \cdot 6H_2O$
F.W. 502.13

U0007	5 g	$17.35
U0008	10 g	27.80

★ HAZARD ALERT: Strong oxidizer. Corrosive and irritating; highly toxic by ingestion. LD_{50} 12 mg/kg.
Storage: Inorganic #3 in a Flinn *Chem-Saf*® Bag in a locked poisons cabinet.
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Fluorescent green/yellow
Odor: None
CAS No. 10102-06-4



Urea

laboratory grade, beads
NH_2CONH_2
F.W. 60.06

U0003	500 g	$ 4.90
U0010	12 kg	41.55

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 57-13-6



Urease

enzyme isolated from jack bean meal
for determination of urea

U0005	100 g	$17.00

Storage: Miscellaneous non-hazardous organic material.
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water
Color: Buff
Odor: Soybean-like
CAS No. 9002-13-5



Urethane

ethyl carbamate
laboratory grade, crystal
$H_2NCO_2C_2H_5$
F.W. 89.10

U0006	100 g	$22.25

★ HAZARD ALERT: Slightly toxic by ingestion; combustible. *Possible carcinogen.* LD_{50} 1800 mg/kg.
Storage: Organic #2
Disposal: #18b
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 51-79-6



VISIT OUR WEBSITE
www.flinnsci.com

V

Vegetable Dyes

see Food Coloring Dyes

Vermiculite

see Super Sorb® on page 919

Vinegar

Cider*	V0001	1 liter	$3.20
	V0002	4 liters	6.85
White†	V0005	4 liters	$7.30

Storage: Organic #1
Disposal: #26b
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: Brown or clear
Odor: Acetic acid
CAS No. 64-19-7





Chemistry Is *Doing*

I hear, and I forget.
I see, and I remember.
I do, and I understand.

Help keep chemistry a "doing" science. Do it safely and resist efforts to make chemistry a survey course.

W

Washing Soda

see Sodium Carbonate

Water

Deionized	**W0007**	1 gallon	**$7.25**
Distilled	**W0001**	1 gallon	**6.15**

Storage: Miscellaneous non-hazardous material.
Disposal: #26b
Shelf Life: Indefinite if kept tightly closed. If your distilled water is stored for a long period, it will gradually become acidic, due to the presence of dissolved CO_2. Boiling the water before use will drive off and eliminate the dissolved CO_2.
Color: Colorless
Odor: None
CAS No. 7732-18-5



Water Glass

see Sodium Silicate Solution

Waterlock®

see Sodium Polyacrylate, Synthetic

Waxes

see individual listings (Carnauba, Paraffin, etc.)

Winkler's Solution #1

manganous sulfate solution
for oxygen determination

W0010	100 mL	**$ 6.65**
W0005	500 mL	**12.75**

Storage: Inorganic #2
Disposal: #27f
Shelf Life: Indefinite
Color: Pink
Odor: None



Technical Note: Both solution #1 and solution #2 are needed for Winkler method.

Winkler's Solution #2

alkaline–iodide solution
for oxygen determination

W0011	100 mL	**$ 7.75**
W0006	500 mL	**15.30**

★ **HAZARD ALERT:** Solution contains sodium hydroxide and potassium iodide solution—corrosive and strongly alkaline. Toxic by ingestion.
Storage: Inorganic #4
Disposal: #10
Shelf Life: Fair to poor.
Color: Colorless
Odor: None



Technical Note: Both solution #1 and solution #2 are needed for Winkler method.

Wintergreen Oil

see Methyl Salicylate

Hood Audit and Smoke Generator

The smoke generator (see page 895) should be placed at or near the center of the internal working space of the hood. With the hood operating and the smoke generator ignited, the smoke should move from immediately in front of the sash directly up and out of the hood chamber allowing no spots of turbulence or dead space. The sash should be placed at the position where it provides the most efficient draft, and then be labeled.

Woods Metal

reagent grade, stick
contains: bismuth 50%; lead 26.7%; tin 13.3%; cadmium 10%

W0008	25 g	**$10.95**
W0009	100 g	**18.20**

Storage: Inorganic #1
Disposal: #27d
Shelf Life: Indefinite
Color: Silver gray
Odor: None
CAS No. 76093-98-6



Safer Purchasing Suggestion: Please review the product listing for Onion's Fusible Alloy. Onion's Fusible Alloy contains no cadmium and, therefore, may be a safer alternative.

Wright's Stain

W0002	5 g	**$9.85**

Storage: Organic #9
Disposal: #26a
Shelf Life: Indefinite
Soluble: Alcohol
Color: Dark green
Odor: None
CAS No. 68988-92-1



Wright's Staining Solution

0.3% in methyl alcohol

W0003	100 mL	**$ 5.95**
W0004	500 mL	**13.10**

★ **HAZARD ALERT:** Methyl alcohol-based solution; flammable liquid. Highly toxic by ingestion.
Storage: Organic #9 in a dedicated flammables cabinet. If one is not available, store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Indefinite
Color: Dark blue
Odor: Alcohol



X

Xylenes

reagent grade
$C_6H_4(CH_3)_2$
F.W. 106.17

X0001	500 mL	**$ 8.10**
X0002	4 liters	**29.21**

★ **HAZARD ALERT:** Flammable liquid; moderate fire risk; slightly toxic by ingestion and inhalation. Avoid skin contact. LD_{50} 4300 mg/kg. TLV 434 mg/m^3.
Storage: Organic #3 in a dedicated flammables cabinet. If one is not available, then store in a Flinn *Saf-Stor*® Can.
Disposal: #18b
Shelf Life: Good if kept tightly closed and stored safely.
Soluble: Alcohol; not water.
Color: Colorless
Odor: Airplane glue
CAS No. 1330-20-7



D-Xylose

wood sugar
$C_5H_{10}O_5$
F.W. 150.14

X0005	25 g	**$11.60**
X0003	100 g	**25.90**

Storage: Organic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: White
Odor: Brown sugar
CAS No. 58-86-6



Y

Yeast Extract

extract, dry, powder — Y0003 100 g $16.55; Y0004 500 g 46.75

Storage: Miscellaneous, non-hazardous organic material.
Disposal: #26a
Shelf Life: Good if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: Yellow
Odor: Sour malt



Yeast

Baker's
viable, three 7 g packets — Y0008 pkg./3 $ 4.40

Brewer's
powder, inactive — Y0002 500 g $12.85

Storage: Miscellaneous, non-hazardous organic material.
Disposal: #26a
Shelf Life: Good if kept dry; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water
Color: Brown
Odor: Malt



Yttrium Oxide

laboratory grade, powder
Y_2O_3
F.W. 225.81

Y0005 5 g $11.20; Y0006 10 g 18.10

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Fair to poor; very hygroscopic.
Soluble: Dilute acids; not water.
Color: White
Odor: None
CAS No. 1314-36-9



Mystery Substances

Identify chemical unknowns using Flinn's Mystery Substance Identification Procedure. For a free copy of this valuable procedure, send your request to:

Flinn Scientific, Inc.
P.O. Box 219 • Batavia, IL 60510

Z

Zeolite

synthetic
strongly acidic cation exchange resin, sodium form for water softening

Z0001 500 g $16.95

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Not intended to be soluble.
Color: Yellow/brown
Odor: None
CAS No. 1318-02-1



Zinc, Dust

laboratory grade
Zn
A.W. 65.37

Z0005 500 g $ 9.50; Z0006 2 kg 29.70
(Both package sizes packaged in PVC-coated bottles)

★ **HAZARD ALERT:** Zinc dust can be a dangerous fire risk; may form explosive mixture with air. If allowed to get damp in a confined bottle, heat will be generated and the mixture may even possibly ignite; cases are known where bottles have exploded under pressure. ***Keep this product dry!***
Storage: Inorganic #1 in a Flinn *Chem-Saf*® Bag to ensure it is kept dry.
Disposal: #26a
Shelf Life: Good if kept dry.
Soluble: Acids and alkalies; not water.
Color: Light gray
Odor: None
CAS No. 7440-66-6



Zinc, Foil

.010″ × 10″ × 36″ — Z0008 ea. roll $13.70

For storage, disposal, etc., see Zinc, Dust, Z0005.



Zinc, Granular

reagent grade, 20 mesh
Zn
A.W. 65.37

Z0028 100 g $ 7.10; Z0002 500 g 22.90

★ **HAZARD ALERT:** Zinc metal dust could be flammable; dust may be present at the bottom of your bottle of this form of zinc.
Storage: Inorganic #1
Disposal: #26a
Shelf Life: Indefinite
Soluble: Acids and alkalies; not water.
Color: White/gray
Odor: None
CAS No. 7440-66-6



Zinc, Mossy

laboratory grade
Zn

Z0003 500 g $ 9.30; Z0004 2 kg 26.15

★ **HAZARD ALERT:** Zinc metal dust could be flammable; dust may be present at the bottom of your bottle of this form of zinc.
For storage, disposal, etc., see Zinc, Granular, Z0020.



Zinc, Pieces

1″ long
convenient for use with Kipp generator

Z0020 100 g $ 7.35; Z0007 500 g 17.65

For storage, disposal, etc., see Zinc, Granular, Z0028.



Did You Know Chemical Waste Is Always Yours?

Waste chemicals from your school are yours *FOREVER!* Yes, your school as the generator is held responsible *in perpetuity* for hazardous chemical waste. Even if you hire a firm to remove the material from your school, it remains yours forever. With that in mind, *always* know and get references for a firm you hire to remove such materials. As one teacher belatedly said after a sad series of disposal events, "I should have known I was in trouble when they came in a rented truck."

Zinc, Sheet

1/32" thick	Z0039		$10.05
	6" × 12", approx. 273 grams		
	Z0009		13.80
	12" × 12", approx. 546 grams		

For storage, disposal, etc., see Zinc, Granular, Z0028.



Zinc, Shot

reagent grade	Z0021	100 g	$14.10
	Z0017	500 g	19.85

For storage, disposal, etc., see Zinc, Granular, Z0028.



Zinc, Strips

.010" thick 5" long × ½" wide	Z0024	pkg./10	$6.75

For storage, disposal, etc., see Zinc, Granular, Z0028.



Zinc Acetate

laboratory grade, crystal $(CH_3CO_2)_2Zn \bullet 2H_2O$ F.W. 219.50	Z0037	100 g	$ 6.95
	Z0010	500 g	15.65

★ **HAZARD ALERT:** Possible body tissue irritant. Moderately toxic by ingestion. LD_{50} 794 mg/kg.

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Good if kept tightly closed; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White
Odor: Faint acetic acid
CAS No. 5970-45-6



Zinc Carbonate Hydroxide

basic zinc carbonate $[ZnCO_3]_2 \bullet [Zn(OH)_2]_3$ F.W. 548.96	Z0038	10 g	$7.15

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Acids, alkalies and ammonium salt solutions
Color: White
Odor: None
CAS No. 5970-47-8



Zinc Chloride

reagent, granular $ZnCl_2$ F.W. 136.29	Z0022	100 g	$7.91
	Z0011	500 g	9.81

★ **HAZARD ALERT:** Both solid and solutions are severe skin irritants; moderately toxic. LD_{50} 350 mg/kg. TLV 1 mg/m^3 as fume.

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Substance deliquescent; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 7646-85-7



Zinc Chloride, Gramolpak

0.1 Molar (as $ZnCl_2$)	* Z0034	pkg.	$6.80

For hazard alert, storage, disposal, etc., see Zinc Chloride, Z0022.

*Gramolpak® is a unique package which makes 1 liter with distilled water.



Zinc Chloride Solution

(as $ZnCl_2$)				
1 Molar	Z0040	500 mL	$12.90
0.5 Molar	Z0033	500 mL	11.90

★ **HAZARD ALERT:** Both solid and solutions would be severe skin irritants.

Storage: Inorganic #2
Disposal: #26b
Shelf Life: Indefinite
Color: Colorless
Odor: None



Zinc Nitrate

flake $Zn(NO_3)_2 \bullet 6H_2O$ F.W. 297.49			
Reagent	Z0029	100 g	$ 7.61
	Z0012	500 g	16.41
Laboratory grade	Z0042	100 g	$ 6.81
	Z0043	500 g	9.91

★ **HAZARD ALERT:** Slightly toxic; severe body tissue irritant; strong oxidant; fire risk. LD_{50} 1190 mg/kg.

Storage: Inorganic #3
Disposal: #26a
Shelf Life: Indefinite
Soluble: Water and alcohol
Color: White
Odor: None
CAS No. 10196-18-6



Zinc Nitrate, Gramolpak

0.1 Molar (as $Zn(NO_3)_2 \bullet 6H_2O$)	* Z0035	pkg.	$4.35

For hazard alert, storage, disposal, etc., see Zinc Nitrate, Z0029.

*Gramolpak® is a unique package which makes 1 liter with distilled water.

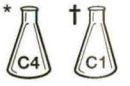


Zinc Nitrate Solution

(as $Zn(NO_3)_2 \bullet 6H_2O$)				
1 Molar*	Z0030	500 mL	$7.20
0.5 Molar†	Z0025	500 mL	6.40
0.1 Molar†	Z0026	500 mL	6.10

★ **HAZARD ALERT:** Moderately toxic by ingestion; severe body tissue irritant.

Storage: Inorganic #3
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Zinc Oxide

laboratory grade, powder ZnO F.W. 81.38	Z0013	500 g	$11.95

★ **HAZARD ALERT:** If heated, fumes could be severely toxic; may react vigorously with some forms of rubber at elevated temperatures. TLV 5 mg/m^3 as fume. LD_{50} 630 mg/kg.

Storage: Inorganic #4
Disposal: #26a
Shelf Life: Indefinite
Soluble: Acids and alkalies; not water and alcohol.
Color: Off-white
Odor: None
CAS No. 1314-13-2



Zinc Stearate

octadecanoic acid, zinc salt
laboratory grade, powder
$C_{36}H_{70}O_4Zn$
F.W. 632.33

	Z0018	500 g	$35.95

Storage: Inorganic #2
Disposal: #26a
Shelf Life: Indefinite
Soluble: Acids; common solvents when hot; not water and alcohol.
Color: White
Odor: New leather
CAS No. 557-05-1



Flinn Gramolpaks® make solution preparation easy.

Zinc Sulfate

granular
$ZnSO_4 \cdot 7H_2O$
F.W. 287.56

Reagent	Z0023	100 g	$ 6.95
	Z0014	500 g	13.85
Laboratory grade	Z0044	500 g	$ 6.90

★ **HAZARD ALERT:** Skin and mucous membrane irritant; slightly toxic. LD_{50} 2150 mg/kg.
Storage: Inorganic #2
Disposal: #26a
Shelf Life: Effloresces in dry air; store in a Flinn *Chem-Saf*® Bag.
Soluble: Water; not alcohol.
Color: White
Odor: None
CAS No. 7446-20-0



Zinc Sulfate, Gramolpak

0.1 Molar
(as $ZnSO_4 \cdot 7H_2O$) * Z0036 pkg. $4.55

For hazard alert, storage, disposal, etc., see Zinc Sulfate, Z0023.
*Gramolpak® is a unique package which makes 1 liter with distilled water.





Zinc Sulfate Solution

(as $ZnSO_4 \cdot 7H_2O$)

1 Molar	Z0031	500 mL	$6.85
0.1 Molar	Z0027	500 mL	4.60

★ **HAZARD ALERT:** May cause skin and eye irritation.
Storage: Inorganic #2
Disposal: #26b
Shelf Life: Good
Color: Colorless
Odor: None



Zinc Sulfide

phosphorescent
laboratory grade, powder
ZnS
F.W. 97.45

	Z0015	25 g	$11.15
	Z0041	100 g	30.95

★ **HAZARD ALERT:** Contact with acid liberates toxic and flammable hydrogen sulfide gas.
Storage: Inorganic #5
Disposal: #26a
Shelf Life: Poor; moisture-sensitive.
Soluble: Acids; not water.
Color: Yellow
Odor: None
CAS No. 1314-98-3



Technical Note: Not all zinc sulfide is phosphorescent. Flinn's zinc sulfide is specially formulated to give phosphorescence—guaranteed.

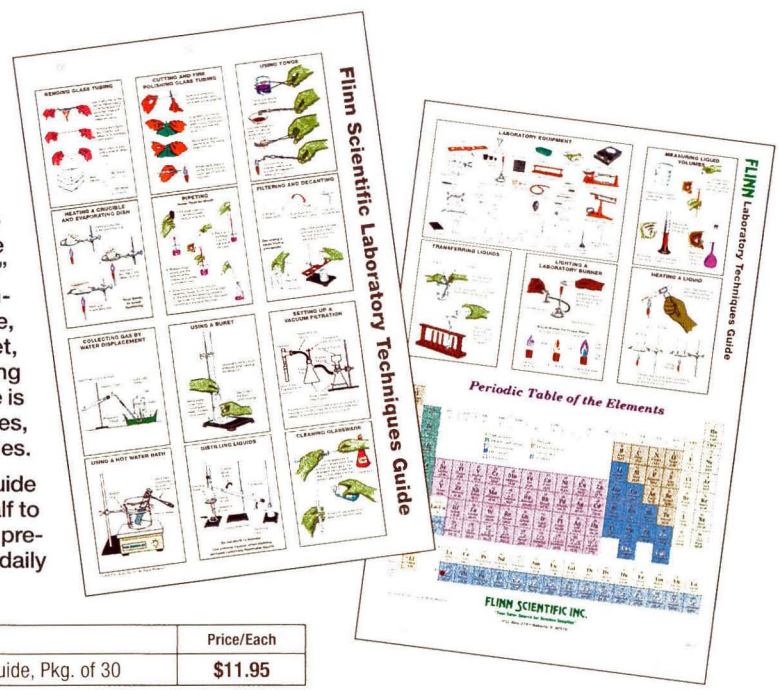
Flinn Scientific Laboratory Techniques Guide

By: The Flinn Staff

What is the proper procedure for lighting a Bunsen burner? Is this a crucible or an evaporating dish? How do I filter this mixture?

Quick and accurate answers to frequently asked lab questions are provided with our new Flinn Laboratory Techniques Guide. This handy reference guide has beautiful color illustrations of lab glassware and equipment to help you teach more effectively and safely. Guide contains 16 "How To" boxes describing the most common lab techniques—lighting a lab burner, heating a crucible, filtering and decanting, using a buret and pipet, collecting a gas by water displacement, distilling liquids, to name a few. A convenient Periodic Table is also provided on the back side with element names, symbols, atomic weights, and color-coded families.

Designed for individual student use, the 11″ × 17″ guide is printed on durable, glossy paper and folds in half to easily fit into a binder or notebook. Reinforced, prepunched left edge allows the guide to stand up to daily student use. Sold in packages of 30.



Catalog No.	Description	Price/Each
AP6248	Flinn Scientific Laboratory Techniques Guide, Pkg. of 30	$11.95