BALL STATE
UNIVERSITY

Disposal of Laboratory Wastes: Requirements for Chemical Disposal to Sinks and Drains

Prepared by the:

Environmental Health and Safety Office
Ball State University

August 2023

DISPOSAL OF LABORATORY WASTES
Requirements for Chemical Disposal to Drains

Contents

DISPOSAL OF LABORATORY WASTES TO SANITARY SEWER

Requirements for Chemical Disposal to Drains

1.0 INTRODUCTION

Some aqueous chemicals or solutions that are not defined as hazardous wastes, and that are either simple inorganic salts or organic materials readily digestible by the microorganisms in a water treatment plant, can generally be disposed of down the drain in limited and controlled quantities.

Since any material poured down a drain eventually flows into the Muncie Wastewater Treatment Facility, and ultimately the White River, the University is regulated by the City of Muncie Sewer Ordinances and the Muncie Bureau of Water Quality (MBWQ) concerning the types and quantities of materials that can enter the sewer system. Beyond the legal requirements, the University also has ethical obligations to protect our environment.

Certain criteria must be met in order for materials to be safely poured down the drain, including low toxicity, high water solubility, and moderate pH. Only small quantities are allowed in the system at any time and the chemicals must be degradable by the wastewater treatment (a biological process). Large quantities, or highly concentrated stock solutions, of these materials should be packaged for pick up and disposal through the Ball State University Environmental Health and Safety (EHS) Office.

Only aqueous solutions of these chemicals can go down the lab drain; solid forms must use other disposal routes (normal trash or pick-up by EHS). The *BSU Waste Management Guide* should be consulted for disposal of solid, hazardous, and other special wastes that due to their identity, nature, or physical characteristics may not be disposed to the municipal sanitary sewerage system.

While this guidance specifically addresses teaching and research laboratories, it also applies to other entities or departments (Art, Fine Arts, Applied Technology, etc.) that may generate liquid wastes requiring disposal.

Staff of the City of Muncie Bureau of Water Quality (MBWQ) were consulted in developing these guidelines to assure that local government regulations and guidelines are followed and treatment capacities can be accommodated. *Prudent Practices in the Laboratory (National Research Council, 2008)* is another information source.

2.0 RESPONSIBILITIES

Within individual laboratories, authorization for specific operations, delineation of appropriate safety procedures, and instruction about these procedures, is a responsibility of the principal investigator, teaching faculty, or academic department.

It is the responsibility of each BSU laboratory worker to be sure that chemical waste generated from their activities is disposed of properly. Some materials can be safely let into the sanitary sewer, while unapproved disposal can cause damage to health, the environment, or the functioning of the sewerage collection system or the wastewater treatment facility itself.

Inappropriate chemicals put down the drain may also be incorporated into sludge formed in wastewater treatment, contaminating it enough to limit its subsequent use where otherwise it might have been recycled. After treated waste water leaves the plant, it flows to the White River, a major scenic, recreational, and drinking water resource for this area. The stewardship of this important natural resource is our collective responsibility.

Laboratory workers, and all BSU employees, should consult this guide before allowing or undertaking drain disposal of any lab chemicals. Adherence to this guidance will be evaluated during laboratory and facility inspections.

3.0 GENERAL SEWER DISPOSAL GUIDELINES

Materials discharged to a laboratory sink drain on campus enter the Muncie sanitary sewer system where it is mixed with sewage and other wastewater from area households and businesses and flows to the Muncie Wastewater Treatment Facility. At the waste treatment plant the waste is subjected to bacterial degradation. Non-degradable chemicals, such as metals, are adsorbed in the sludge or potentially discharged to surface waters. The drain disposal guidelines outlined below must be followed to prevent toxic concentrations of metals or organic compounds from reaching surface waters, accumulating in the sludge, or disrupting the sewage treatment process.

What May Be Disposed?

Generally, materials suitable for sewer disposal in limited quantities must meet the following physical and chemical criteria:

- They are liquids and readily water soluble (at least 3% soluble)
- Easily biodegradable or amenable to treatment by the waste water treatment process
- Are simple salt solutions of low toxicity inorganic substances

- Are dilute organic substances of low aquatic toxicity and low concentration
- Have a pH between 5.5 and 9.0

Chemicals that can be safely disposed down the drain include biological compounds and cellular constituents such as proteins, nucleic acids, carbohydrates, sugars, amino acids amines, nutrients, surfactants, and many metabolic intermediates. Other compounds include soluble salt combinations of low toxicity ions and dilute (less than 10%) aqueous solutions of low molecular weight biodegradable organic chemicals such as alcohols, aldehydes, ketones, amines, ethers, cellosolves, nitriles, esters and nitroalkanes.

Send down the drain only those materials found on the **Safe List** that follows. Compounds not listed are not suitable for drain disposal unless specifically approved by the BSU EHS Office following consultation with the MBWQ.

Where May Disposal Occur?

Drain disposal must only be used when the drain flows to a sanitary sewer system* which eventually goes to the waste water treatment plant. Storm drain systems flow directly into surface water (Cardinal Creek, or via storm sewers to the White River, for example) and should NEVER be used for chemical disposal. Floor drains may flow to storm sewers and should also never be used for disposal. Laboratory sinks should be used for disposal of chemicals on the Safe List as discussed below, and proper procedures followed in discharging the wastes to the sink drain.

How Much May be Disposed?

Quantities of chemical waste for drain disposal should be limited generally to a few hundred grams or milliliters or less per day. Larger amounts should have prior approval from EHS. Materials listed as safe for drain disposal in this document are approved for drain disposal in quantities up to 100 grams or 100 milliliter per discharge. Disposal should be followed by flushing with at least 100-fold excess of water at the sink. (That means for 100 ml of chemical disposed, run the water for about two minutes at maximum flow.)

Note: Sulfuric, hydrochloric, acetic and phosphoric acids may be discharged in larger quantities since they are to be neutralized to a pH of between 5.5 and 9.0 before they may be drain disposed to the sanitary sewer (see **Appendix A**).

** Sanitary sewer is the system of sinks, toilets, drains and associated pipes that send waste water to a treatment plant where it is biologically and chemically treated before discharge into the environment. Under no circumstances should chemical wastes be discharged to storm sewer systems.*

Safety Concerns?

Understand the hazards and toxicity of the materials you work with by consulting Safety Data Sheets (available in every department workplace, on the Internet, or through EHS). First, verify that the chemical or solution may be disposed to the sanitary sewer in accordance with these requirements and guidelines. During the disposal process, work slowly to avoid splashes and wear the proper protective equipment (lab coat, goggles, face shield, gloves). Consult the *BSU Chemical Hygiene Plan* for proper handling procedures for chemicals.

Chemicals that are not appropriate for drain disposal are to be collected by the Environmental Health and Safety Office for disposal as hazardous, special, or solid wastes. These procedures are provided in the *BSU Waste Management Guide*.

4.0 CHEMICALS NOT SAFE FOR DRAIN DISPOSAL

THE FOLLOWING TYPES OF MATERIALS ARE <u>PROHIBITED</u> FROM DRAIN DISPOSAL BY THE CITY OF MUNCIE AND BSU:

- Ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, manure, hair and fleshings, entrails, paint residues, solid or viscous substances capable of causing obstruction to the flow of sewers.
- Oil, grease, petroleum, or other water insoluble chemicals
- Materials that are not biodegradable or would pass through the sewage treatment plant into the White River and be toxic to aquatic organisms or accumulate in sediments.
- Materials that could interfere with the biological processes of sewage treatment or would contaminate the sludge-making disposal or reuse through the normal methods difficult or impossible.
- All compounds that could result in the presence of toxic gases or vapors within the POTW in a quantity that may cause acute worker health and safety problems
- Infectious substances
- Hazardous Wastes – either listed or characteristic hazardous wastes
- Some general types of chemicals that are not appropriate for drain disposal (unless otherwise allowed in this guidance) include:
    - Halogenated hydrocarbons (exceeding the concentrations in the tables below);
    - Nitro compounds (organic compounds that contain one or more nitro functional groups (-NO2) and are often explosive;

- Mercaptans (thiols);
- Flammables (immiscible in water) or at concentrations of concern;
- Explosives such as azides and peroxides;
- Water soluble polymers that could form gels in the sewer system;
- Water reactive materials;
- Malodorous chemicals;
- Toxic chemicals such as carcinogens, mutagens, teratogens;
- Nanomaterials

- Substances that boil below 50° C (122°F);

- Solid or viscous substances in amounts that will cause obstruction of the flow in the sewerage system;

- Flammable and combustible solvents (flashpoints less than 140°F) (unless sufficiently diluted in water as part of the laboratory process such that the solution has a residual flashpoint greater than 140°F);

- Discharges with a pH below 5.5 or higher than 9.0;

- Mixtures that have a component not found on the Safe List;

- Any discharges that would cause violation of the numerical or discharge quality limits imposed by the City of Muncie Bureau of Water Quality General or Industrial Pretreatment Ordinances;

- Malodorous compounds or volatile organic chemicals that can escape from the plumbing system (such as dry traps) causing exposures or obnoxious odors (such as mercaptans or thiols);

- Any wastes that could impart color that cannot be removed by the MBWQ treatment process – i.e., dye wastes, stains;

- Metallic ions and salts of the heavy metals in solutions or suspension in concentrations exceeding the following:

Element	Concentration (Mg/l)
Arsenic	0.20
Barium	2.0
Boron	5.0
Cadmium	0.2
Chromium	2.0
Copper	2.0
Cyanide	1.0
Element	**Concentration (Mg/l)**
Lead	2.0
Manganese	1.0

Mercury	0.01
Nickel	2.0
Selenium	0.02
Silver	2.5
Zinc	4.0

Note: *Above limits are derived from the Muncie Industrial Pretreatment Ordinance and other local ordinances.*

Organic compounds in solutions or suspension in concentrations exceeding the following:

Element	Concentration (Mg/l)
Benzene	0.5 (EPA)
Carbon tetrachloride	0.5 (EPA)
Chlorobenzene	100 (EPA)
Chloroform	100 (EPA)
Cresol (or total of o-, m- and p-Cresol)	200 (EPA)
1 ,4-Dichlorobenzene	7.5 (EPA)
1 ,2-Dichloroethane	0.5 (EPA)
1,1 -Dichloroethylene	0.7 (EPA)
2,4-Dinitrotoluene	0.13 (EPA)
Hexachlorobenzene	0.013 (EPA)
Hexachlorobutadiene	0.5 (EPA)
Hexachloroethane	3.0 (EPA)
Methyl ethyl ketone	200 (EPA)
Nitrobenzene	2.0 (EPA)
Pentachlorophenol	100 (EPA)
Pyridine	5.0 (EPA)
Tetrachloroethylene	0.7 (EPA)
Toxaphene	0.5 (EPA)
Trichloroethylene	0.5 (EPA)
2,4,5-Trichlorophenol	400 (EPA)
2,4,6-Trichlorophenol	2.0 (EPA)
Vinyl chloride	0.2 (EPA)

Pesticides in solutions or suspension in concentrations exceeding the following:

Element	Concentration (Mg/l)
Chlordane	0.3 (EPA)
2,4-D	10.0 (EPA)
Endrin	0.02 (EPA)
Heptachlor (and its epoxide)	0.008 (EPA)
Lindane	0.4 (EPA)
Methoxychlor	10.0 (EPA)
2,4,5-TP (Silvex)	1.0 (EPA)

***Note: The** above limitations are based on RCRA TCLP threshold limits, but for <u>total</u> concentrations of the constituents in the waste solution (i.e., concentrations exceeding these threshold limits constitute characteristic hazardous wastes).*

Organic wastes that would cause the discharge to exceed a Total Toxic Organic (TTO) concentration of 2.13 mg/l.

Biological wastes exceeding the following:

> Any discharge of fats, oils, or greases of animal or vegetable origin that exceeds 200 mg/L.

Any material not found on the Safe List presented in Section 5.0 below must be approved by the EHS Office for drain disposal.

Check with the BSU EHS Office at 285-2807 if you are not certain about drain disposal for a particular material. We may also be able to provide you with instructions for laboratory detoxification for some materials.

5.0 CHEMICALS SAFE FOR DRAIN DISPOSAL

When discharging waste to the sanitary sewer, you must:

- Never dispose anything that might lead to a storm sewer rather than a sanitary sewer.
- Use a sink that does not have a history of clogging or overflowing.
- Use a sink in your laboratory, preferably in a fume hood.
- Flush with at least 10-20 fold excess of water after drain disposal to thoroughly rinse out the sink and sink trap, and to fully neutralize or inactivate the waste for discharge.
- Limit the quantities being discharged to 100 grams of solute per laboratory per day.
- Wear gloves, eye protection and a laboratory coat.
- Inactivate biological materials (e.g., autoclave or bleach-treat) before releasing to sewer.

Inorganics

Dilute solutions of inorganic salts where both cation and anion are listed below are suitable for drain disposal. Materials listed are considered to be relatively low in toxicity. Compounds of any of these ions that are strongly acidic or basic should be neutralized before drain disposal (see **Appendix A**).

Cations	Anions
Aluminum (Al^{+3})	Borates(BO_3^{-3}
Calcium (Ca^{+2})	Bromide (Br^-)
Iron ($Fe^{+2,+3}$)	Bromate (BrO_3^-)
Hydrogen (H^+)	Carbonate (CO_3^{-2})
Potassium (K^+)	Bicarbonate (HCO_3^-)
Lithium (Li^+)	Chloride (Cl^-)
Magnesium (Mg^{+2})	Chlorate (ClO_3)
Sodium (Na^+)	Bisulfite (HSO^{-3})
Ammonium (NH_4^+)	Cyanates (OCN^-)
Tin (Sn^{+2})	Hydroxide (OH^-)
Strontium ($Sr2^+$)	Iodide (I^-)
Titanium ($Ti^{+3,+4}$)	Iodate (IO_3^-)
Zirconium (Zr^{+2})	Nitrate (NO_3^-)
	Nitrite (NO_2^-)
	Phosphate (PO_4^{-3})
	Sulfate (SO_4^{-2})
	Sulfite (SO_3^{-2})
	Thiocyanate (SCN^-)

- Mineral acids and bases should be neutralized to a pH 5.5 to 9.0 range before disposal – see the recommended procedures in **Appendix A**.

Organics

Materials listed below in quantities up to about 100g or 100 ml at a time are suitable for disposal down the drain while flushing with excess water. These materials are soluble to at least 3 percent, present low toxicity hazards, and are readily biodegradable.

Alcohols

Alkanols with 4 or fewer carbon atoms:

methanol
ethanol
propanol and isomers
butanol and
isomers

Alkanediols with 7 or fewer carbon atoms

ethylene glycol
propylene glycol

butylene glycol
butanediol + isomers
pentylene glycol
pentanediol + isomers hexylene glycol
hexanediol + isomers
heptamethylene glycol
heptanediol + isomers

Alkoxyalkanols with 6 or fewer carbon atoms:

methoxyethanol
ethoxyethanol
butoxyethanol
2-methoxyethoxyethanol
n-C4H9OCH2CH2OCH2CH2OH (2(2-butoxyethoxy)ethanol)

Aldehydes

Aliphatic aldehydes with 4 or fewer carbon atoms:

formaldehyde (10% or less aqueous solution)
propanal (propionaldehyde)
butanal (butyraldehyde)
isobutyraldehyde

Amides

RCONH2 and RCONHR with 4 or fewer carbon atoms and RCONR2 with 10 or fewer carbon atoms:

formamide
N-methyl formamide
N,N-diethyl formamide
N,N-dimethyl formamide
N-ethyl formamide
acetamide
N-methyl acetamide
N,N-dimethyl acetamide
N-ethyl acetamide
propionamide
N-methyl propionamide
N, N-dimethyl propionamide

butyramide
isobutyramide

Amines

Aliphatic amines with 6 or fewer carbon atoms:*

methylamine
ethylamine
trimethylamine
N-ethyl methylamine
N-methyl propylamine
dimethyl propylamine
isopropylamine
1-ethyl propylamine
butylamine
methyl butylamine
N-ethyl butylamine
isobutylamine
amylamine
hexylamine

Aliphatic diamines with 6 or fewer carbon atoms:

1,2- or 1,3- propanediamine (1,2- or 1,3- diaminopropane)

* Amines with a disagreeable odor, such as dimethylamine and 1,4-butanediamine should be neutralized, and the resulting salt solutions flushed down the drain, mixed with at least 100 volumes of water in order to ensure complete neutralization and inactivation. Disposal limit is 100ml of material.

Carboxylic Acids

*Alkanoic acids with 5 or fewer carbon atom:**

formic acid
acetic acid
propionic acid
butyric acid
isobutyric acid
valeric acid
isovaleric acid

Alkanedioic acids with 5 or fewer carbon atoms:

oxalic acid (1,2-ethanedioic acid)
malonic acid (1,3-propanedioic acid)

succinic acid (1,4-butanedioic acid)
glutaric acid (1,5-pentanedioic acid)

Hydroxyalkanoic acids with 5 or fewer carbon atoms:

lactic acid (2- hydroxypropanoic acid)
3-hydroxybutyric acid
2-hydroxy isobutyric acid

Aminoalkanoic acids with 6 or fewer carbon atoms and the ammonium, sodium and potassium salts o f these acids.

Amino acids and the ammonium, sodium and potassium salts of these acids.

*Organic acids with a disagreeable odor, such as butyric acids and valeric acids should be neutralized and the resulting salt solutions flushed down the drain, mixed with at least 100 volumes of water to ensure complete neutralization and deactivation. Disposal limit is 100 ml. of material.

Esters

Esters with 4 or fewer carbon atoms:

methyl formate
ethyl formate
isopropyl formate
propyl formate
methyl acetate
ethyl acetate
methyl propionate
Isopropyl acetate

Ketones

Ketones with 4 or fewer carbon atoms:

acetone
methyl ethyl ketone (butanone)
methyl isopropyl ketone (3-methyl butanone)

Sulfonic Acids and the Ammonium, Sodium, and Potassium Salts of these Acids:

methane sulfonic acid, sodium or potassium salt
ethane sulfonic acid, sodium or potassium salt

1-propane sulfonic acid, sodium or potassium salt
1-butane sulfonic acid, sodium or potassium salt
1-pentane sulfonic acid, sodium or potassium salt
1-hexane sulfonic acid, sodium or potassium salt
1-heptane sulfonic acid, sodium or potassium salt
1-octane sulfonic acid, sodium or potassium salt
1-decane sulfonic acid, sodium or potassium salt
1-dodecane sulfonic acid, sodium or potassium salt
1-tetradecane sulfonic acid, sodium or potassium salt
1-hexadecane sulfonic acid, sodium or potassium salt

Note: Before discharging any of these materials into sewer make sure that all other generic disposal criteria such as pH limits and flammability are met.

6.0 RADIOACTIVE MATERIALS

Radioactive materials **may not be drain disposed**.

APPENDIX A

NEUTRALIZATION OF SPENT ACIDS AND BASES

Spent mineral acids, straight-chain fatty acids, and bases (hydroxides) comprise a large portion of the unwanted chemicals being generated or stored in campus laboratories or utility maintenance activities. As a part of regular laboratory procedures, campus labs should neutralize spent inorganic acids, acetic acid, straight-chain fatty acids, and bases (hydroxides) that do not contain metal or organic contaminants. These chemicals will be managed in an "elementary neutralization unit" and, therefore, are not considered a part of the hazardous waste stream for the campus. An "elementary neutralization unit" is a container used for neutralizing corrosive wastes.

Neutralization is a relatively simple procedure that is best done by and in the laboratory that uses inorganic acids, acetic acid, straight-chain fatty acids, and bases (hydroxides) on a regular basis. The laboratory that generates spent corrosives usually has the facilities and expertise to neutralize them, and therefore will be responsible for doing so. The following procedures (**see A - D**) describe the proper technique for neutralization of spent inorganic acids, acetic acid, straight-chain fatty acids, and bases (hydroxides) as a part of regular laboratory procedures. At the end of this Appendix are lists of corrosives to be managed in-house by campus laboratories. Aqueous corrosive wastes shall NOT contain sulfides, cyanides, metals, or other materials that can give off hazardous fumes upon reaction with the acid or base.

Do **NOT** use these procedures for:

- *INORGANIC ACIDS THAT CONTAIN HEAVY METALS* (e.g., Atomic Absorption Standards, arsenic, cadmium, chromium, lead, mercury, nickel, selenium, silver, thallium. Solutions containing sodium, potassium, magnesium, iron can be neutralized as long as the anion is also non-hazardous.)

- *ESTERS OF INORGANIC ACIDS*

- *CHROMIC ACID*

- *PERCHLORIC ACID*

- *HYDROFLUORIC ACID*

- *ORGANIC ACIDS (EXCEPT ACETIC ACID AND STRAIGHT-CHAIN FATTY ACIDS)*

- LARGE QUANTITIES OF NITRIC ACID

A. Equipment Needed for Neutralizing Acids and Bases

1. Sodium carbonate (Soda ash), baking soda, or diluted inorganic base (hydroxide) for neutralization of an acid, or a diluted inorganic acid for neutralization of a base.

2. Polyethylene bucket - 1- or 2-gallon size, as personal preference dictates. Remember that 1-gallon weighs approximately 8 pounds or greater.

3. Protective equipment (goggles, apron, gloves).

4. 500 ml beakers.

5. pH Indicator Strips, or other pH test method.

B. Personal Protective Equipment

Read the Safety Data Sheet (SDS) for detailed information. Call the BSU EHS Office if an SDS is not available. The **MINIMUM** recommended personal protection needed when performing the neutralization procedure is:

Ventilation: Work in a fume hood

Gloves: Use neoprene, natural rubber, butyl, polyethylene, nitrile butadiene, or polyvinyl chloride depending on the SDS information

Clothing: Apron (rubber is preferred), lab coat (or protective suit or coveralls), and closed-toe shoes.

Eye Protection: Splash-proof or dust-proof goggles **AND** a face-shield (8-inch minimum)

Hands shall always be washed after working with these chemicals. An eyewash station and quick-drench facility shall be located in the area. All employees shall locate these emergency facilities ***before starting to work***.

WARNING: *REMEMBER THAT EXTREME HEAT CAN BE PRODUCED BY THIS PROCEDURE UNLESS IT IS DONE VERY SLOWLY AND WELL-DILUTED. CLOSELY MONITOR THE AMOUNT OF HEAT PRODUCED BY USING A THERMOMETOR OR TOUCHING THE OUTSIDE OF THE NEUTRALIZATION CONTAINER. USE ICE BATH IF NECESSARY.*

C. Neutralization Procedure for Acid

1. Make a saturated solution of sodium carbonate (soda ash) in a beaker or use an inorganic base diluted in water (1:10 ratio) - set aside.

2. Put tap water into 1- or 2-gallon polyethylene bucket.

3. Dilute acid at least 1:10 (1-part acid to 9 parts of water) by slowly pouring and ***stirring the acid into the water***.

4. Slowly add soda ash or other basic solution into diluted acid with stirring, or save diluted acid to neutralize bases as described below.

5. Monitor pH with pH meter, pH indicator strips, or other pH test method.

6. When pH is between 6 and 9, dispose in a drain followed with excess water. A pH near 7 is preferred to reduce the possibility of plumbing damage.

HELPFUL HINT: *When neutralizing an acid, the pH can be tested quickly by the following method. Make a saturated solution of sodium bicarbonate in water. A small amount of sodium bicarbonate solution poured into the acid will make a "fizz", which is a release of carbon dioxide. Since carbon dioxide evolves from these procedures, insure adequate ventilation is available. This "fizz" will indicate that the solution is still acidic, and needs more base to be added. Always stir the mixture and do a final check of the pH before pouring the neutralized acid down the drain.*

D. Base Neutralization

1. Put tap water into 1- or 2-gallon polyethylene bucket.

2. Dilute alkali wastes at least 1:10 (1-part alkali to 9 parts water) by slowly pouring and ***stirring the base into the water***.

3. Neutralize the diluted alkali solution with a previously diluted inorganic acid.

4. Monitor pH with pH meter, pH indicator strips, or other pH test method.

5. When pH is between 6 and 9, dispose in a drain followed with excess water. A pH near 7 is preferred to reduce the possibility of plumbing damage.

NOTE*: For concentrated acids and bases, neutralization must be done slowly and with vigorous stirring. If there are any questions, or if you are hesitant about attempting this procedure with any spent acid or alkali waste, please confer with your principal investigator, laboratory manager, or department advisor. The recommended time for the neutralization procedure is when the wastewater flow is at a peak, e.g., 9:00 a.m.*

INORGANIC ACIDS

NAME/MOLECULAR WT.	FORMULA	SYNONYMS
Sulfuric Acid M.W. - 98.08	H_2SO_4	Dipping Acid Oil of Vitrol Sulphuric Acid Nordhausen Acid
Boric Acid M.W. - 61.84	BH_3O_3	Boracic Acid Orthoboric Acid
Nitric Acid M.W. - 63.02	HNO_3	Aqua Fortis Azotic Acid Hydrogen Nitrate
Hyponitrous Acid	$H_2N_2O_2$	
Hydrochloric Acid M.W. - 36.46	HCl	Chlorohydric Acid Hydrochloride Muriatic Acid
Aqua Regia	HCL/HNO_3 (3:1 mixture)	Nitrohydrochloric Acid Nitromuriatic Acid
Phosphoric Acid M.W. - 98.00	H_3PO_4	Orthophosphoric Acid

INORGANIC BASES

NAME/MOLECULAR WT.	FORMULA	SYNONYMS
Aluminum Hydroxide M.W. - 78.01	$Al(OH)_3$	Alumigel Aluminahydrate AluminaTrihydrate AluminumHydrate Aluminum (III)
Ammonium Hydroxide	NH_4OH	Ammonia Aqueous
Hydroxide		Aluminum Oxide-3H20 Aluminum Trihydroxide
Calcium Carbonate M.W. - 100.09	CaCO3	Precipitated Chalk Chalk Dolomite Limestone/Marble
Calcium Hydroxide M.W. - 74.10	Ca (OH)2	Slaked Lime Lime Water Hydrated Lime Calcium Hydrate
Calcium Oxide M.W. - 56.08	CaO	Lime Burnt Lime Calcia Calx Lime, Unslaked Quicklime
Magnesium Carbonate M.W. - 84.32	MgCO3	Carbonate Magnesium Magnesia Alba Magnesium Carbonate- (Precipitated)
Magnesium Hydroxide M.W. - 58.33	Mg(OH)2	Magnesia Magma Magnesium Hydrate Milk of Magnesia
Potassium Hydroxide M.W. - 56.11	KOH	Caustic Potash Lye Potassium Hydrate
Sodium Bicarbonate M.W - 85.01	NaHCO3	Baking Soda Bicarbonate of Soda Sodium Acid Carbonate
Sodium Carbonate M.W - 105.99	Na2CO3	Soda Ash Crystol Carbonate Carbonic Acid - Disodium Salt
Sodium Hydroxide M.W. - 40.00	NaOH	Lye Caustic Soda Soda Lye Sodium Hydrate