

Lab waste drain disposal

Montana State University

General Guidelines

- **What**
- Send down the drain only those materials found on the safe list. Compounds not listed are not suitable for drain disposal.
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- **Where**
- Drain disposal must only be used when the drain flows to a sanitary sewer system* which eventually goes to the wastewater treatment plant. Storm drain systems flow directly into surface water (East Gallatin for example) and should NEVER be used for chemical disposal. Laboratory sinks should be used for disposal of chemicals on the safe list as discussed below.

General Guidelines (cont'd)

- **How Much**

- 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 Chemical Safety. Only 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 run the water for about two minutes at maximum flow.)

- **Safety**

- Understand the hazards and toxicity of the materials you work with by consulting material safety data sheets (soon to be available in every department). Work slowly to avoid splashes and wear the proper protective equipment (lab coat, goggles, face shield, gloves) during drain disposal.
- *Sanitary sewer is the system of sinks, toilets, drains and associated pipes that send wastewater to a treatment plant where it is biologically and chemically treated before discharge into the environment.

NOT SAFE for drain disposal

- Ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, manure, hair and fleshing, entrails, paint residues, solid or viscous substances capable of causing obstruction to the flow of sewers.
- Halogenated hydrocarbons
- Nitro compounds
- Mercaptans
- Flammables (immiscible in water)
- 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
- Substances that boil below 50° C.
- Mixtures that have a component not found on the safe list.
- Any material not found on the safe list.

SAFE for drain disposal - 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.

• Cation	Anions
• Al ⁺³	BO ₃ ⁻³
• Ca ⁺²	B ₄ O ₇ ⁻²
• Fe ^{+2, +3}	Br ⁻
• H ⁺	CO ₃ ⁻²
• K ⁺	Cl ⁻
• Li ⁺	HSO ₃ ⁻³
• Mg ⁺²	OCN ⁻
• Na ⁺	OH ⁻
• NH ₄ ⁺	I ⁻
• Sn ⁺²	NO ₃ ⁻
• Sr ⁺²	PO ₄ ⁻³
• Ti ^{+3, +4}	SO ₄ ⁻²
• Zr ⁺²	SCN ⁻

- Mineral acids and bases should be neutralized to pH 5.5 to 9 range before disposal, following procedures in Appendix A.
- Copper and Zinc have specific discharge limits required by the Sewage Treatment Plant. Contact Chemical Safety at 994-3572 prior to discharging any copper or zinc solutions.

Safe - Organics

- Materials listed below in quantities up to about **10g 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. Larger volumes must be collected by the Chemical Safety Team.

Safe - Alcohol

- 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)

Safe - Amides

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- RCONH_2 and RCONHR with 4 or fewer carbon atoms and RCONR_2 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

Safe - 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, diluted with at least 100 volumes of water. Disposal limit is 100ml of material.

Safe – Carboxylic acids

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- Alkanoic acids with 5 or fewer carbon atom: *
- formic acid
- acetic acid
- propionic acid
- butyric acid*
- isobutyric acid
- valeric acid*
- isovaleric acid
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- 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)
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- Hydroxyalkanoic acids with 5 or fewer carbon atoms:
- lactic acid (2- hydroxypropanoic acid)
- 3-hydroxybutyric acid
- 2-hydroxy isobutyric acid
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- Aminoalkanoic acids with 6 or fewer carbon atoms and the ammonium, sodium and potassium salts of these acids.
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- Amino acids and the ammonium, sodium and potassium salts of these acids.
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- *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, diluted with at least 100 volumes of water. Disposal limit is 100 ml. of material.
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Safe - Ester

- Esters with 4 or fewer carbon atoms:
 - methyl formate
 - ethyl formate
 - isopropyl formate
 - propyl formate
 - methyl acetate
 - ethyl acetate
 - methyl propionate
 - Isopropyl acetate

Safe - Ketone

- Ketones with 4 or fewer carbon atoms:
 - acetone
 - methyl ethyl ketone (butanone)
 - methyl isopropyl ketone (3-methyl butanone)
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- 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