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Corrosives Fact Sheet

This document is for general safety awareness. Individual Standard Operating Procedures for all experiments and processes involving corrosives must be developed by the laboratory.

PROPERTIES & HAZARDS

Acids, bases, oxidizers, and other compounds can have corrosive properties. These can be solids, liquids, or gases. Corrosive liquid chemicals are those with a pH of 4.0 or lower or a pH of 9 or higher. Corrosives can cause immediate injury to exposed body parts including eyes, skin, and respiratory system. Injuries are usually referred to as burns. The severity of a burn can vary with concentration. Exposure of the skin or eyes to concentrated acids can cause severe burns. Vapors from liquid concentrated acids can irritate eyes and respiratory tract. Acidic gases can cause severe damage to the skin, eyes, and respiratory tract. Exposures to strong bases can be very dangerous due to the fact that even a concentrated solution often causes no pain until the injury is severe. Base exposure on the skin may feel slippery or soapy, bases are generally harder to remove from the skin than acids.

Corrosives can also damage organic (e.g., wood, plastics) and inorganic substances (e.g., metal, glass) that can impact storage and material selection for experiment materials.

Hazard classification for corrosive chemicals is indicated in Section 2 – Hazard Identification in safety data sheets (SDS) or on chemical bottles.

Hazard Classification and Category	Pictogram	Hazard Statement
Corrosive to Metals – Category 1		May be corrosive to metals
Skin corrosion/ irritation – Category 1A, B, C		Causes severe skin burns and eye damage
Skin corrosion/irritation – Category 2		Causes skin irritation
Serious eye damage/eye irritation– Category 1		Causes serious eye damage/eye irritation
Serious eye damage/eye irritation– Category 2		Causes serious eye irritation

Chemicals may have additional hazards beyond being corrosive (e.g., nitric acid is also an oxidizer, glacial acetic acid is also flammable) that may impact handling and storage.

CONTROLS

Engineering Controls

- Chemical fume hood
- Corrosive storage cabinets
- Safety Shower (within 55 feet of the work area)

Personal Protective Equipment

- Gloves - generally, nitrile or neoprene provide adequate protection against minor splashes for most chemicals. Consult glove manufacturer's chemical compatibility guides for best glove selection, or alternative glove types if needed for specific chemicals that penetrate nitrile or neoprene. SDS recommendations on glove type should be reviewed.
- Splash goggles
- Clothing that leaves no exposed skin on legs or feet
- Closed-toe shoes that fully cover the top of the foot
- Chemical Resistant Apron*
- Face Shield*

**For work with large volumes of corrosive materials and/or when pouring.*

Training

- Laboratory Specific Training must cover all processes using corrosives and include information on safe use and emergency response.

STORAGE

- Always store corrosives in compatible secondary containment.
- Do not store corrosives near any equipment with exposed metal that may be damaged over time by exposure to corrosive vapors.
- Do not store corrosives underneath sinks. Off-gassing from chemical bottles can corrode metal pipes and lead to a flood.
- Store corrosives at eye level or below.
- Corrosive storage cabinets are commercially available and should be used, if possible, for storage of corrosives. Corrosives can damage most uncoated metal cabinets.
- Acids should be stored separated from bases.
- Acids should be further segregated into separate storage areas. Organic acids (e.g., glacial acetic, formic, propionic, lactic) are incompatible with oxidizing acids (e.g., nitric, sulfuric, perchloric, chromic) and should be stored separately.
- Never store hydroxide solutions in metal containers. There is a possibility of hydrogen gas evolution, container leakage, and rupture in these containers.

USE

- When possible, purchase and use the smallest volume necessary for work.
- Handling of corrosive chemicals should be done in a fume hood.
- Areas where corrosive chemicals are used must have an eye wash station and emergency shower within 10 seconds (~55 feet) of the work area. There must be no obstacles, such as a door to reach the eye wash station or shower.
- Add the corrosive to water (not water to corrosive) slowly when diluting to prevent splashing and excessive heat generation.
- Use heat resistant lab ware and allow for extra volume to account for expansion or a vigorous reaction. It may be necessary to cool the reaction vessel during mixing processes.
- Use a funnel when pouring larger volumes of corrosives.
- Heating of perchloric acid in open systems can only be conducted in a wash-down fume hood, specifically designed for use with perchloric acid. The vast majority of the fume hoods on campus do not have this capability. See Perchloric Acid Fact Sheet.
- Additional first aid and measures are required for using hydrofluoric acid. See Hydrofluoric Acid Fact Sheet.
- Additional measures are required for using nitric acid. See Nitric Acid Fact Sheet.

Waste

- Waste should be managed so that incompatible materials are not mixed.
- Waste containers should be compatible with their contents and should be segregated by hazard class into separate secondary containers.
- For questions regarding waste management contact ESSR, Environmental Affairs at envaffairs@umd.edu.

Spill Cleanup

- Spill cleanup must follow the items specified in the Emergency Response Guide posted in the laboratory.
- If the laboratory is equipped and personnel are trained, minor spills can be handled by laboratory personnel.

- If a spill is beyond the capacity of the laboratory to address, call (301) 405-3333 from a safe location.

REFERENCES AND ADDITIONAL RESOURCES

1. OSHA A Guide to the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)
2. OSHA Occupational Exposure to Hazardous Chemicals in Laboratories
3. Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards, National Academy Press, Washington, DC, 2011.