

BASES (ALKALIS)

STANDARD OPERATING PROCEDURE

Type of SOP: Process Hazardous Chemical Hazard Class

Department: _____ **Building:** _____ **Room #:** _____

Principal Investigator: _____ **Phone #:** _____

Prepared By: _____ **Email:** _____ **Date:** _____

1. HAZARD OVERVIEW



Bases are generally chemicals containing the hydroxide (OH⁻) anion, or materials that form hydroxide when added to water, e.g., carbonates. Bases are “corrosives” (like acids) and will destroy body tissue. The extent of injury depends on factors such as the type and concentration of the chemical, the route of exposure, the type of tissue contacted, and the speed used in applying emergency measures. Since pain does not occur immediately, skin contact with strong bases usually goes unnoticed.

All base solutions are considered hazardous.

The eyes are especially susceptible to bases and must be immediately flushed with water for at least 15 minutes if exposure occurs. Inhaling airborne dust and mist from bases irritate the nose, throat, and lungs. Pulmonary edema, a severe irritation of the lungs resulting in fluid production that prevents the transfer of oxygen to the bloodstream, can also occur from extreme airborne exposures. Secondary toxic effects may occur if the material is absorbed from the lungs into the bloodstream. The extent of these effects depends on the concentration in air and the duration of exposure.

Dilution of bases is exothermic and can result in the surface boiling and spattering. Therefore, always add the base to the water, thereby having a more dilute solution surface heating. This is particularly true for potassium hydroxide. Concentrated solutions of inorganic bases are not in themselves flammable.

Common Bases: Ammonium hydroxide; Barium hydroxide; Calcium hydroxide; Potassium hydroxide; Sodium hydroxide; Lithium hydroxide; Bicarbonate salt; and Carbonate salt.

2. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Given the tissue-damaging characteristics as well the PPE requirements OSHA regulation and New Jersey Institute of Technology (NJIT) policy, it is essential that proper PPE is always worn when handling corrosive materials. At minimum, safety glasses, lab coats, and gloves are required. Additional or more protective PPE may be required pending the volume, corrosivity, and unique hazards. Please refer to the NJIT Chemical Hygiene Guide and Hazard Assessment Form to determine the proper PPE for handling corrosive materials.



3. ENGINEERING/VENTILATION CONTROLS

In general, bases should always be transferred and dispensed in a properly functioning chemical fume hood. Please review the NJIT Chemical Hygiene Guide and the Safe Chemical Fume Hood Use Guide for information on the proper use of a chemical fume hood and criteria for implementing engineering controls.

Chemical Fume Hood Glovebox Biological Safety Cabinet Other _____

Room Location of Unit(s): _____

4. SPECIAL HANDLING PROCEDURES AND STORAGE REQUIREMENTS

- Bases can be only used in areas properly equipped with a certified eye wash/safety shower that can be reached within ten seconds.
- A relatively cool, dry environment free from extremes of temperature--humidity should be maintained. Some NJIT labs have ventilated “corrosive” cabinets built-in beneath the fume hood.
- Follow any substance-specific storage guidance provided in Safety Data Sheet (SDS).
- Bases should be stored in a manner that separates them from incompatible materials. Each base should be stored in a manner consistent with its properties.
- Bases should be stored in material that is base-resistant. This facilitates flushing and other cleanup procedures in the event of leaks or spills.
- Store on low shelves or in base storage cabinets.
- Use bottle carriers for transporting materials when possible.
- Store solutions of inorganic hydroxides in polyethylene containers.
- Use small quantities whenever possible. Monitor your inventory closely to assure that you have tight control over your material.

5. INCIDENTS AND ACCIDENTS

Laboratory personnel are to report all occupational injuries or illnesses to Faculty/PI as soon as practical. The Faculty/PI and laboratory personnel must submit the required paperwork to NJIT EHS Department. See the the Emergency Response Guidelines posted in the laboratory or Emergency Procedures section of the NJIT CHG for proper procedures involving an injury, exposure, fire, or release/spill of a hazardous material.

In the event of an emergency, DIAL 9-1-1 to activate emergency response personnel.

6. SPILL AND DECONTAMINATION

Wear proper PPE. Collect any crystals with a brush – avoid creating dust. Decontaminate equipment and work surfaces using appropriate decontamination/cleaning solution. Dispose of all used contaminated disposables in the appropriate waste stream following the Waste Disposal Section of the NJIT CHG.

Decontamination Solution(s): _____

Additional Spill / Decontamination Requirements:

7. WASTE DISPOSAL

Follow the practices and procedures in accordance with the NJIT Laboratory Waste Management Program to properly dispose of waste.

Additional Waste Disposal Requirements:

8. PRIOR APPROVAL/REVIEW

9. DESIGNATED USE AREA

Designated Use Area Location(s): _____

10. SAFETY DATA SHEETS

Location of SDS: _____

11. LAB-SPECIFIC INFORMATION (required) ([Examples](#) of appropriate content)