

2. Corrosives

Standard operating procedures (SOP) are intended to provide you with general guidance on how to safely work with a specific class of chemical or hazard. This SOP is generic in nature. It addresses the use and handling of substances by hazard class only. In some instances multiple SOPs may be applicable for a specific chemical (i.e., both the SOPs for flammable liquids and carcinogens would apply to benzene). If you have questions concerning the applicability of any item listed in this procedure, contact Vanderbilt Environmental Health and Safety (322-2057) or the Principal Investigator of your laboratory. Specific written procedures are the responsibility of the principal investigator.

If compliance with all the requirements of this standard operating procedure is not possible, the principal investigator must develop a written procedure that will be used in its place. This alternate procedure must provide the same level of protection as the SOP it replaces. Vanderbilt Environmental Health and Safety is available to provide guidance during the development of alternate procedures.

Corrosive chemicals are substances that cause visible destruction or permanent changes in human skin tissue at the site of contact, or are highly corrosive to steel. The major classes of corrosives include strong mineral acids, organic acids and strong bases.

Training:

All Vanderbilt employees who work with hazardous chemicals must be apprised of the hazards of chemicals present in their work area. This training must be provided before initial assignment and before new exposure situations. Before a lab worker may begin work with Corrosive Liquids they must be trained on the lab specific Standard Operating Procedure for these materials.

The primary factors that lab workers need to be trained on in regard to corrosives are how the pH of the chemical relates to its corrosiveness, the identity and location of corrosives in the lab, the nature of the injuries associated with corrosive materials, procedures for handling corrosive materials, measures to treat spills, special containers for corrosive materials and storage procedures.

Securing of gas cylinders

See Appendix O, section 10

Decontamination procedures

Personnel: Immediately flush contaminated area with copious amounts of water after contact with corrosive materials. Remove any jewelry to facilitate removal of chemicals. If a delayed response is noted report immediately for medical attention. Be prepared to detail what chemicals were involved.

If the incident involves hydrofluoric acid (HF), seek immediate medical attention. If there is any doubt about the severity of the injury, seek immediate medical attention.

Area: Decontamination procedures vary depending on the material being handled. The corrosivity of some materials can be neutralized with other reagents. Special neutralizing agents should be on hand to decontaminate areas.

Designated area:

Not applicable

Emergency procedure:

Emergency procedures, which address response actions to fires, explosions, spills, injury to staff, or the development of sign and symptom of overexposure, must be developed. The procedures should address as a minimum the following:

- Who to contact: University police, and Vanderbilt Environmental Health and Safety, Principal investigator of the laboratory including evening phone number
- The location of all safety equipment (showers, spill clean up supplies, eye wash, fire extinguishers, etc.)
- The method used to alert personnel in nearby areas of potential hazards
- Specific first aid treatment required by the type of corrosive material(s) handled in the laboratory (Student Health Clinic or Occupational Health Clinic should be consulted for first aid procedures.)

Eye protection:

Eye protection in the form of safety glasses must be worn at all times when handling corrosive materials. Ordinary (street) prescription glasses do not provide adequate protection and cannot pass the rigorous test for industrial safety glasses.. Adequate safety glasses must meet the requirements of the Practice for Occupational and Educational Eye and Face Protection (ANSI Z.87. 1 1989) and must be equipped with side shields. Safety glasses with side shields do not provide adequate protection from splashes. Therefore, when the potential for splash hazard exists, other eye protection and/or face protection must be worn. It is recommended that face shields be worn when a splash potential exists with corrosive materials.

Eyewash:

Where the eyes or body of any person may be exposed to corrosive chemicals, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use. Bottle type eyewash stations are not acceptable.

Glove (dry) box:

Not applicable

Gloves:

Gloves should be worn when handling corrosive chemicals. Nitrile gloves provide adequate protection against accidental hand contact with small quantities of most laboratory chemicals. However, when larger quantities are handled or regular contact is involved more protective gloves should be used. Lab workers should contact VEHS for advice on chemical resistant glove selection when direct or prolonged contact with hazardous chemicals is anticipated. A glove assessment chart can be found in Appendix H.

Hazard assessment:

Hazard assessment should include instruction on proper use and handling, spill control and splash protection.

Lab hood:

Manipulation of corrosive substances should be carried out in a fume hood if corrosive vapor production is anticipated.

Labels:

All corrosive chemicals must be clearly labeled with the correct chemical name. Handwritten labels are acceptable; chemical formulas and structural formulas or abbreviations are not acceptable.

Protective apparel:

Appropriate lab attire (lab coats, closed-toe shoes and long-sleeved clothing) should be worn when handling corrosive materials. Additional protective clothing should be worn if the possibility of skin contact is likely.

Safety shielding:

Safety shielding is required any time there is a risk of explosion, splash hazard or a highly exothermic reaction. All manipulations of corrosive materials, which pose this risk, should occur in a fume hood with the sash in the lowest feasible position. Portable shields, which provide protection to all laboratory occupants are acceptable.

Safety shower:

A safety shower should be available in a nearby location where the corrosive material is used.

Special storage

Segregate the various types of corrosives. Separate acids and bases. Liquids and solids should also be separated. Specially designed corrosion resistant cabinets should be used for the storage of large quantities of corrosive materials. Store corrosives on plastic trays. Do not store corrosive materials on high cabinets or shelves.

Special ventilation

Manipulation of some corrosive materials outside of a fume hood may require special ventilation controls in order to minimize exposure to the material. Fume hoods provide the best protection against exposure to corrosive materials in the laboratory and are the preferred ventilation control device.

Spill response

Anticipate spills by having the appropriate clean up equipment on hand. The appropriate clean up supplies can be determined by consulting the material safety data sheet. This should occur prior to the use of any corrosive chemical. Corrosive spill controls neutralize the hazardous nature of the spilled material. Acids and bases require different types of spill control materials. In the event of a spill all personnel in the area should be alerted. Do not attempt to handle a large spill of corrosive materials. Vacate the laboratory immediately and call for assistance.

- Vanderbilt University Police Department (VUPD) 1-1911 or 322-2745

Remain on the scene, but at a safe distance, to receive and direct safety personnel when they arrive.

Vacuum protection

Not applicable

Waste disposal

Most corrosive materials are hazardous wastes. When ever possible, attempt to design research in a manner that reduces the quantity of waste generated. Corrosives can be neutralized as part of experimental protocol. Questions regarding waste disposal should be directed to the Vanderbilt Environmental Health and Safety. This department can also assist you in minimizing waste generation.