The City College of New York

Office of Environmental Health and Occupational Safety

# Laboratory Chemical Spill Cleanup and Response Guide

Compton-Goethals CG04
137th Street and Convent Avenue
New York, NY 10031
**212-650-5080**
ehos@ccny.cuny.edu

## Contents


i. Scope

1. Flammable Liquids
2. Non-Flammable Organic Liquids
3. Acids
4. Solid Acids
5. Bases
6. Mercury
7. Oxidizers
8. Highly Toxic Materials
9. Air and Water Reactive Materials
10. Compressed Gases

Appendix A. Spill Kits

Appendix B. Globally Harmonized System


## Scope

Lab locations handling chemicals with different hazard classes require specific spill response directions for safe handling of any chemical spills. This guide provides the baseline information required for lab staff to respond to and clean small spills according to their hazard class(es). Hazard information should be determined based on the Safety Data Sheets (SDS) provided for the chemicals used.

More stringent spill requirements may be stipulated in the SDS or Standard Operating Procedures for a particular chemical. In addition, large spills that cannot be handled by the present lab staff should always be referred to Public Safety at **(212)-650-7777** and the EHOS department at **(212)-650-5080**.


Flammable liquids have flash points at or below 37.8 degrees Celsius (100 degrees Fahrenheit),evaporate quickly, and within a short period of time can reach high vapor concentration. Some common examples of flammable liquids include ethanol, methanol, hexane, diethyl ether, acetone, and toluene. Larger spills of flammable liquids that exceed the lower explosion limit (LEL), may require response by the fire department

and our emergency response vendor. Spills of more than 500 ML are considered an emergency and Public Safety should be contacted.

Smaller spills can be cleaned up by local personnel who have proper supplies, training, and PPE.

## Flammable Liquid Small-spill Clean-up Procedure

1. Use absorbent to create a small dike around the spill (if safe to do so).
2. Extinguish any open flames. Make sure all materials used for clean-up are spark proof.
3. Close doors to prevent spread of vapors.
4. Consult chemical's SDS for further steps and precautions.
5. Don the appropriate PPE (gloves, goggles/face shield, boot covers, lab coat).
6. Use absorbent to pick up loose liquid and place absorbent in a spill bag for disposal ashazardous waste.
7. Contact EHOS and Public Safety to fill out an incident report.

Evacuate and close off the area at any point the situation feels unsafe or overwhelming. Contact Public Safety.

# 2. Non-flammable Organic Liquids

Organic liquids (combustible or not) are not a fire hazard at room temperature. The principal hazard from non-flammable, volatile liquid spills is exposure to the vapor by inhalation or skin absorption. A spill of more than one liter is an emergency and requires area evacuation. Contactpublic Safety and EHOS. Smaller spills can be cleaned up by local personnel who have proper supplies, training, and PPE.

## Organic Liquid Small-spill Clean-up Procedure

1. Use absorbent to create a small dike around the spill (if safe to do so).
2. Extinguish any open flames.
3. Consult chemical's SDS for further steps and precautions.
4. Don the appropriate PPE (gloves, goggles/face shield, boot covers, lab coat).
5. Use absorbent to pick up loose liquid and place absorbent in a spill bag for disposal ashazardous waste. Mop remaining residue with soap and water.
6. Contact EHOS and Public Safety to fill out an incident report.

Evacuate and close off the area at any point the situation feels unsafe or overwhelming. ContactPublic Safety.

## 3. Acids

The principal concern is the corrosive effects of these substances. Dilute solutions irritate theskin, while concentrated solutions can result in serious burns and may react violently with water.

Hydrofluoric acid can penetrate deeply and damage underlying tissue/bone. Hydrofluoric acidspills require special response procedures. All laboratories that work with hydrofluoric acid must have a site-specific safe-work procedure that includes spill and emergency response procedures. Calcium gluconate must be readily available within the lab.

A spill of more than one liter of liquid or 500 grams of solid acid is an emergency that requiresarea evacuation and notification of Public Safety and EHOS. All spills of hydrofluoric acid are emergencies. Smaller spills can be cleaned up by local personnel who have proper supplies, training, and PPE.

Liquid Acid Small-spill Clean-up Procedure

1. Use absorbent to create a small dike around the spill (if safe to do so).
2. Isolate and evacuate the spill area.
3. Take note of volatile vapors.
4. Consult chemical's SDS for further steps and precautions.
5. Don the appropriate PPE (gloves, goggles/face shield, boot covers, lab coat).
6. Carefully check the pH of the spilled liquid. If it is less than pH 6, neutralize with acidneutralizer or any dilute solution of 5% sodium bicarbonate.
7. Use absorbent to pick up loose liquid and place absorbent in a spill bag for disposal ashazardous waste. Mop remaining residue with soap and water.
8. Contact EHOS and Public Safety to fill out an incident report.

## 4. Solid Acid Small-spill Clean-up Procedure

1. Isolate and evacuate the spill area.
2. Take note of volatile vapors.
3. Consult chemical's SDS for further steps and precautions.
4. Don the appropriate PPE (gloves, goggles/face shield, boot covers, lab coat).
5. If necessary, slightly moisten solid to minimize dust production. Use water, or if thematerial is water reactive, another inert liquid (e.g. ethylene glycol).
6. Sweep up the residue using spark-proof tools and place the residue to a spill bag forhazardous waste disposal.
7. Carefully check the pH of the spilled liquid. If it is less than pH 6, neutralize with acid neutralizer or any dilute solution of 5% sodium bicarbonate. The final pH should be between 6 and 10. Use absorbent to remove the final residue. Mop remaining area withsoap and water.
8. Contact EHOS and Public Safety to fill out an incident report.

Evacuate and close off the area at any point the situation feels unsafe or overwhelming. Contact Public Safety.


## 5. Bases

Like acids, the principal concern is the corrosive effects of these substances. Dilute solutionsirritate the skin, while concentrated solutions can result in serious burns.

A spill of more than one liter of liquid or 500 grams of solid alkali or base is an emergency thatrequires area evacuation and notification of Public Safety and EHOS. Smaller spills can be cleaned up by local personnel who have proper supplies, training, and PPE.

Liquid Alkali or Base Small-spill Clean-up Procedures

1. Use absorbent to create a small dike around the spill (if safe to do so).
2. Isolate and evacuate the spill area.
3. Take note of volatile vapors.
4. Consult chemical's SDS for further steps and precautions.
5. Don the appropriate PPE (gloves, goggles/face shield, boot covers, lab coat).
6. Apply sodium carbonate. Carefully check the pH of the spilled liquid. If it is greater thanpH 10, neutralize with base neutralizer or any dilute solution of 5% citric acid.
7. Use absorbent to pick up loose liquid and place absorbent in a spill bag for disposal ashazardous waste. Mop remaining residue with soap and water.
8. Contact EHOS and Public Safety to fill out an incident report.


# 6. Mercury

Elemental mercury and mercury compounds are toxic by inhalation and in some case, absorption through the skin. Although mercury evaporates slowly, in areas of poor ventilationthe vapor concentration will increase over time and become a chronic or acute health hazard.

Spills in excess of 30 milliliters are emergencies that require area evacuation and notification ofPublic Safety and EHOS. Smaller spills can be cleaned up by local personnel who have proper supplies, training, and PPE.

Mercury Small-spill Clean-up Procedure

1. Isolate and evacuate the spill area.
2. Assemble spill clean-up team and spill kit outside of spill area.
3. Don the appropriate PPE (gloves, goggles, shoe covers, lab coat/Tyvek, respirator withmercury vapor cartridges).
4. Use a razor blade, scraper, or similar tool to gently push small droplets of mercury together and remove them using an aspirator or disposable pipette. Try to minimizespreading the mercury vapor. If a mercury vacuum is available, use this to collect themercury.
5. Pipette the aspirate mercury into a labeled glass hazardous waste container. Shine a flashlight on the surface to identify small mercury droplets or "beads" that escape intocracks or crevices.
6. Spread a commercial mercury amalgam mix over the contaminated surface after all visible mercury droplets have been removed. Sweep up mercury amalgam using a small brush anddispose of it with the other mercury waste. Take care not to break up any mercury droplets. Alternately, wipe the surface using a mercury absorbent cloth (mercon wipes) or suppressant and dispose of it with the other mercury waste.
7. Dispose of all PPE with the mercury waste as well.
8. Contact EHOS and Public Safety to fill out an incident report.

Evacuate and close off the area at any point the situation feels unsafe or overwhelming. Contact Public Safety.


# 7. Oxidizers

Oxidizing agents can ignite organic solvents and combustible materials. They are also skin andrespiratory irritants. Examples include concentrated hydrogen peroxide, permanganate, chlorate, nitrate, and dichromate compounds. Spills in excess of one liter of liquid or 500 grams of solid oxidizer are emergencies and require area evacuation and notification of Public Safety and EHOS. Smaller spills can be cleaned up by local personnel who have proper supplies,training, and PPE.

Oxidizer Small-spill Clean-up Procedure

1. Use absorbent to create a small dike around the spill (if safe to do so).
2. Isolate and evacuate the spill area.
3. Take note of volatile vapors.
4. Consult chemical's SDS for further steps and precautions.
5. Don the appropriate PPE (gloves, goggles/face shield, boot covers, lab coat).
6. Use absorbent to pick up loose liquid and place absorbent in a spill bag for disposal as hazardous waste. Sweep solid residue using spark-proof tools and dispose of the residue as hazardous waste. If there is still oxidizer residue left in the spill area, neutralize with dilute 5% sodium thiosulfate solution and remove the residue. Mop remaining residue withsoap and water.
7. Contact EHOS and Public Safety to fill out an incident report.

Evacuate and close off the area at any point the situation feels unsafe or overwhelming. Contact Public Safety.

# 8. Highly Toxic Materials

EHOS prefers to assess each spill of this nature. Highly toxic material spills should be evaluated on an individual basis.

Highly toxic chemicals include those with high acute systemic toxicity, and substances with chronic toxic effects such as carcinogens, reproductive or developmental (embryotoxins, teratogens) toxins, and mutagens. Also included in this category are compounds that can easilyproduce toxic products. For example, cyanide and sulfide salts produce toxic hydrogen cyanideand hydrogen sulfide, respectively, in the presence of acids. In general, spills of more than 100milliliters of liquid or 50 grams of solid of these substances are emergencies and require evacuation and notification of Public Safety and EHOS. Smaller spills may be cleaned up by localpersonnel who have proper supplies, training, and PPE.

Liquid Highly Toxic Materials Small-spill Clean-up Procedure

1. Use absorbent to create a small dike around the spill (if safe to do so).
2. Isolate and evacuate the spill area.
3. Take note of volatile vapors.
4. Consult chemical's SDS for further steps and precautions.
5. Don the appropriate PPE (gloves, goggles/face shield, boot covers, lab coat).
6. Use absorbent to pick up loose liquid and place absorbent in a spill bag for disposal as hazardous waste. Sweep solid residue using spark-proof tools and dispose of the residueas hazardous waste. Mop remaining residue with soap and water. Dispose of this as hazardous waste as well.
7. Contact EHOS and Public Safety to fill out an incident report.


## 9. Air and Water Reactive Material

These materials are particularly hazardous because they will rapidly react with water and/or airto produce toxic and/or potentially explosive products. Pyrophoric substances may spontaneously ignite. Typical examples of water and air reactive materials include alkali metals,metal hydrides, and strong reducing agents such as sodium borohydride.

All spills of air and water reactive materials are emergencies. Evacuate the area and contact Public Safety and EHOS immediately. If it is safe to do so, use dry sand or kitty litter to absorbthe spill and prevent further spread/reactions before evacuating the area.

## 10. Compressed Gas Leaks

Compressed gas leaks can be roughly divided into two categories. The first is those leaks that occur away from the cylinder in gas lines, tubing, or apparatus. These, once detected, can generally be stopped by closing the main cylinder valve. The second is those leaks that occur atthe cylinder itself and cannot be stopped by closing the cylinder valve. Similarly, in some cases,it may not be possible to close a cylinder valve due to age or poor condition of the valve.

All leaking gas cylinders are an emergency, if the leak cannot be stopped by closing the cylindervalve. Leaks of oxygen, flammable gas, or toxic gas are especially dangerous. The following procedure should be followed:

1. If a leak is suspected, perform a leak test with a commercial leak detection solution ornon-reactive, detergent solution. If leak is detected, proceed to Step 2.
2. If leak cannot be stopped by closing the cylinder valve and it is an inert atmospheric gas (e.g., nitrogen, carbon dioxide, etc.) clear the affected area and/or floor. If the leak is of a flammable, toxic, or corrosive gas and is outside of a ventilated enclosure that will containthe gas, immediately activate the building fire alarm system and evacuate the building.
3. If not already done so, contact Public Safety and EHOS. Meet responders and provideinformation on the nature, extent, and exact location of the leak.


# Appendix A. Spill Kits

All labs should have chemical spill kits available. Their use is not mandatory but they should beavailable. Contact EHOS (extension x5080) for updated spill kits. Spill kits should have basic PPE, absorbent padding, a waste bag, and acid/base neutralization powder. Mercury amalgam powder is also available.

# Appendix B. Globally Harmonized System

The Globally Harmonized System (GHS) has 9 symbols for the classification and labeling of potential hazards.