



Potential Hazards

- Contents under pressure present mechanical and projectile hazards and may explode in heat or fire.
- Contents may be flammable or combustible and may form explosive mixtures in air.
- Contents may be asphyxiants, corrosive, flammable, poisonous, or pyrophoric. Check MSDS or call the supplier for information.
- Uncontrolled gas leaks can become an inhalation hazard.

Response Actions/Cleanup Methods

Compressed Gas Leak – Simple

A simple gas leak presents no or only minimal inhalation or fire hazard.

- Be aware that gases can accumulate and displace oxygen in a space that is not well ventilated. This is an asphyxiation hazard.
- Remove ignition sources if gas is flammable.
- Restrict access to the area.
- Place cylinder in or next to a fume hood if possible.
- Tighten fittings on cylinder.
- Locate leak with soapy water (at below-freezing temperatures, use a 50% glycerin solution).
- If cylinder is still leaking, contact the supplier for additional information and suggestions.
- If a fume hood is not available and there is a direct route outdoors, a plastic bag may be placed over the slowly leaking valve and sealed with duct tape to hold it in place. Then move to the outdoor location using an appropriate cylinder cart.
- Notify your supervisor.

Note: Do not try to repair the leak if the leak is at the junction of the cylinder valve and the cylinder. In this situation, contact the supplier and ask for appropriate response instructions.

Compressed Gas Leak – Major

A major gas leak presents a large or uncontrollable leak or fire hazard, involves an acutely toxic gas, and/or more than minimal personal risk.

- Alert area occupants and have them evacuate the area.
- Call 911.
- Turn off ignition sources.
- If possible, ventilate the affected area (only if it can be done safely and only if the leak is vented to the outside) prior to leaving the area. Leave fume hoods running.
- Provide information to emergency responders.
- The manufacturer/supplier may need to be contacted for emergency repair information.

Additional Information on Preparedness for Gas Leaks

If your area is using a compressed gas, plans should be developed regarding how to handle a simple and major leak prior to using the gas. Additional information on compressed gas safety is provided in the online HPO training course "*Compressed Gas Safety*".

Before use, consult with the manufacturer or supplier of your compressed gas for additional safety procedures and recommended methods for response to leaking valves.

Potential Hazards

- Some corrosive acids may be ignitable. Examples include glacial acetic acid, formic acid, and butyric acid – use flammable material cleanup guidance.
- Some can ignite combustible material. Examples include oxidizing acids such as perchloric or chromic acid.
- Contact causes burns to skin or eyes.
- May be harmful if inhaled.
- Concentrated corrosive acids may react vigorously with water.
- Some may be water-sensitive or may generate toxic gases when combined with other chemicals.

Basic Supplies (See EHS Spill Preparedness and Response Training for additional information)

Materials	PPE	Waste Handling
Absorbent pads, pillows, or loose sorbent, OR Acid neutralizer such as Spill-X-A, Neutrasorb, sodium carbonate (soda ash), sodium bicarbonate, or calcium carbonate	Splash goggles Lab coat or apron Shoe Covers (optional) Chemical-resistant gloves	Sealable container Plastic mixing tools Heavy duty waste bags Tape to seal bags Hazardous waste labels

Response Actions/Cleanup Methods

- Alert others in the spill area.
- Don't touch or walk through the spilled material.
- Shut off ignition sources.
- Wear eye and skin protection. Use gloves compatible with acids such as a thick nitrile or neoprene. Avoid breathing vapors.
- As quickly as possible, dike the spilled liquid to prevent spreading.
 - Spill pillows, pads, or a general absorbent material may be used.
 - Use only inert non-combustible absorbents with oxidizing acids.
- If acid is neutralizable**, use a weak base such as sodium carbonate (soda ash), sodium bicarbonate, or calcium carbonate. You can also use an acid neutralizer product such as Spill-X-A® (need pH paper with it), Neutrasorb® (has built-in pH indicator).
 - Add neutralizer slowly and work from edges of spill inward. Use caution because the reaction can cause splattering.
 - Mix the neutralizer with a plastic spatula or other tool. Be sure to mix well to assure material is neutralized.
 - Test pH or use product's color indicator to determine level of neutralization.
 - When pH is 6-8, it is no longer considered hazardous waste. The neutralized material may be carefully dissolved in water and washed down the sink.
 - Any items used to absorb or dike non-neutralized acid should be considered corrosive and disposed of as hazardous waste.
 - After the neutralized spill material has been picked up, spray the area lightly with water; test with pH paper to ensure all corrosive material has been removed.
- Clean up spill with absorbent if it's not recommended to neutralize the acid** or if a neutralizer is not used.
- If solid, you do not need to neutralize or absorb.
- Pick up spill cleanup materials with plastic tools and place into a plastic or glass container with a sealable lid. The material may also be double-bagged and placed into a sealable cardboard box.
- Label material for collection by EHS.
- Thoroughly ventilate the area after cleanup.
- Clean the area with detergent and water after the spill cleanup.

****Acids that may be neutralized include hydrochloric acid, sulfuric acid, nitric acid, and phosphoric acid.**

Do not neutralize acids that contain heavy metals or are oxidizing acids. Examples of acids that you should not neutralize include chromic acid, perchloric acid, and fuming nitric acid. **Do not neutralize hydrofluoric acid.**

Note – some acids may not be washed down the drain even if neutralized because they have other characteristics that make them hazardous; for example, neutralized chromic acid cannot be sewered because it contains the toxic heavy metal chromium. For these acids, simply absorb the material, rather than neutralize it.

Factors That Can Complicate Spill Response

- Spilled corrosive acid material may become a major spill due to presence of ignition sources if the acid is flammable, combustible, or oxidizing.
- Spilled corrosive acid material may become a major spill due to a large quantity spilled, a complex situation such as multiple chemicals spilled or involved in a spill, or if special respiratory protection is required for response.
- Special respiratory protection may be required if there is an inhalation hazard due to:
 - Increased toxicity/volatility
 - Severe short term health effects
 - Highly volatile or toxic materials spilled in poorly ventilated areas, etc. For example, a large quantity of concentrated hydrochloric acid would be both corrosive and volatile and can quickly cause respiratory tract damage if inhaled.
- Hydrofluoric acid (HF) requires very special precautions to protect health, an absorbent that is compatible with HF (not a silica or sand-based material), and written spill response procedures in place **prior** to beginning its use.



Potential Hazards

- Some corrosive bases may be ignitable. Examples include triethylamine, isopropylamine – use flammable material cleanup guidance.
- Contact causes burns to skin or eyes.
- May be harmful if inhaled.
- Concentrated material may react vigorously with water.

Basic Supplies (See HPO Spill Preparedness and Response Training for additional information)

Materials	PPE	Waste Handling
Absorbent pads, pillows, or loose sorbent, OR Base neutralizer such as Spill-X-C, citric acid, sodium bisulfate, or dilute acetic acid may be used	Splash goggles Lab coat or apron Shoe Covers (optional) Chemical-resistant gloves	Sealable container Plastic mixing tools Heavy duty waste bags Tape to seal bags Hazardous waste labels

Response Actions/Cleanup Methods

- Alert others in the spill area.
- Don't touch or walk through the spilled material.
- Wear eye and skin protection. Use gloves that are compatible with bases such as a thicker nitrile or neoprene. However, be aware that some bases require a more chemical resistant glove such as Silver Shield®/4H®.
- Avoid breathing vapors.
- As quickly as possible, dike the spilled liquid to prevent spreading. If the spill is a solid, you do not need to neutralize or absorb it.
- Spill pillows or a general absorbent material may be used.
- For solutions of inorganic bases, use a weak acid such as citric acid, sodium bisulfate, or dilute acetic acid to neutralize the base. You can also use a commercial neutralizer product such as Spill-X-C® (need pH paper with it), Neutracid®-2 (has built-in pH indicator).
 - Add neutralizer slowly; work from edges of spill inward. Use caution because the reaction can cause splattering.
 - Mix the neutralizer with a plastic spatula or other tool.
 - Test pH or use the product's color indicator to determine the level of neutralization.
 - When pH is between 6-8, the material is no longer considered hazardous waste. The neutralized material may be carefully dissolved in water and washed down the sink.
 - Any items used to absorb or dike non-neutralized base should be considered corrosive and disposed of as hazardous waste.
 - After the neutralized spill material has been picked up, spray the area lightly with water; test with pH paper to ensure all corrosive material has been removed.
- If a neutralizer is not used, cover with absorbent.
- Pick up spill cleanup material with plastic tools and place into a plastic or glass container with a sealable lid. The material may also be double-bagged and placed into a sealable cardboard box.
- Label material for collection by HPO.
- Thoroughly ventilate the area after cleanup.
- Clean the area with detergent and water.

Factors That Can Complicate Spill Response

- Spilled corrosive bases may become a major spill due to a large quantity spilled, a complex situation such as multiple chemicals spilled or involved in a spill, or if special respiratory protection is required for response.
- Special respiratory protection may be required if there is an inhalation hazard due to –
 - Increased toxicity/volatility.
 - Severe short term health effects.
 - Highly volatile or toxic materials spilled in poorly ventilated areas.

Potential Hazards

- Flammable/combustible material may be ignited by heat, sparks or flames.
- Vapors may travel to a source of ignition and flash back.
- Containers may explode in heat or fire.
- May be poisonous if inhaled or absorbed through skin.
- Contact may irritate or burn skin and eyes.
- Vapors may cause dizziness or suffocation at high concentrations.

Basic Supplies (See EHS Spill Preparedness and Response Training for additional information)

Materials

Absorbent pads, pillows, or loose sorbent; OR
Solvent absorbent such as Spill-X-S or Solusorb
(Spill-X-S, Solusorb may be used for non-oxidizing liquids, only)

PPE

Splash goggles
Lab coat or apron
Shoe Covers (optional)
Chemical-resistant gloves

Waste Handling

Sealable container
Non-sparking (plastic) mixing tools
Heavy duty waste bags
Tape to seal bags
Hazardous waste labels

Response Actions/Cleanup Methods

- Act quickly.
- Alert other workers.
- Don't touch or walk through the spilled material.
- Extinguish all flames.
- Turn off all spark-producing equipment. If vapors are in the vicinity of an ignition source, shut off power from a remote circuit breaker box instead.
- Wear eye and skin protection. Use gloves compatible with solvents. Avoid breathing vapors.
- Quickly, dike or soak up the spilled liquid; cover with a sheet of plastic or plastic-backed absorbent pad to suppress vapor if absorbent is not immediately/readily available.
 - Spill pillows, pads, or a general absorbent material may be used but do not reduce vapors.
 - Use a solvent spill absorbent such as Spill-X-S®, Solusorb®, or activated charcoal for materials with a low flash point since they can reduce vapor as well as absorb the spill; however, excess absorbent may be needed to significantly reduce the flash point. Refer to the absorbent manufacturer's spill treatment information. (Keep this information available in the spill kit).
- Use non-sparking tools (plastic scoop, shovel, dustpan) to:
 - Mix the absorbent with the spilled material until it appears dry and free flowing.
 - Place the cleanup material into a plastic or glass container with a sealable lid.
- Label spill cleanup materials for collection by EHS.
- Thoroughly ventilate the area after the cleanup.
- Clean the area with detergent and water after the spill cleanup.
- NEVER use a vacuum cleaner or Shop-Vac to clean up flammable material spills or debris because contact with the motor could start a fire.

Factors That Can Complicate Spill Response

- Many flammable/combustible solvents can readily permeate some protective gloves. Keep gloves in the spill kit that are resistant to solvents (e.g., Silver Shield®/4H® available from vendors such as Fisher Safety, Lab Safety Supply, or VWR).
- Spilled flammable/combustible material can become a major spill if:
 - There are nearby ignition sources.
 - A large quantity of the material is spilled.
 - Multiple chemicals are spilled or are involved in a spill.
 - Special respiratory protection is required for response.
- Respiratory protection may be required if an inhalation hazard is present due to:
 - A material's increased toxicity and/or volatility.
 - The material causes severe short term health effects.
 - A highly volatile or toxic material is spilled in a poorly ventilated area. For example, if spilled, a significant quantity of the flammable material diethyl ether would quickly generate a high concentration in air due to its high volatility.

Potential Hazards

- Contact causes burns to skin or eyes.
- Material is toxic.
- May be absorbed through the skin.
- Liquid generates vapor that may be harmful if inhaled. Mercury metal has no noticeable odor or warning properties.
- Vapor generation will increase with increased heat.

Basic Supplies (See EHS Spill Preparedness and Response Training for additional information)

Materials

Suction device such as Pasteur pipette or syringe without needle
Mercury collection sponge and container
Card or scraper
Forceps/tool to pick up sharps
Flashlight

PPE

Lab coat or apron
Shoe covers (optional)
Splash goggles
Chemical-resistant gloves

Waste Handling

Zip-top plastic bags
Heavy duty waste bags
Masking or duct tape
Sealable container
Hazardous waste labels

Response Actions/Cleanup Methods

Spill Type – Small quantity such as a broken thermometer.

- Small amounts of spilled mercury can be safely cleaned up by using the following general precautions:
 - Avoid skin contact.
 - Minimize the disturbance of material during cleanup to minimize vapors; and
 - Concentrate on getting the bulk of the spilled material into a sealed container before beginning any additional cleanup steps.
- Skin and eye protection are needed because mercury can be absorbed through the skin. Double 4-mil thick nitrile gloves may be used.
- Mercury vapors will go into the air at a very slow rate when the liquid is undisturbed (unless it is heated), so do not disturb the spill until you are ready to clean it up.
- The cleanup procedures depend on the location of the spill and the surface needing to be cleaned.

Response Actions/Cleanup Methods

General

- Stabilize the spill without contaminating yourself and isolate the area to prevent others from coming in contact with the spill and enlarging the spill area.
- Keep mercury away from sinks and drains.
- Do not touch or walk through spilled material. Do not disturb it until ready to clean it up.
- Determine if the surface is porous (such as carpet, upholstery, or fabric) or non-porous (sealed wood, vinyl, and linoleum). Observe the area for cracks, crevices or other places where mercury can collect.
- Plan and conduct the cleanup.
- Do not use a broom. The mercury will break up, spread, and generate vapor.
- Do not use a vacuum! Ordinary vacuums will spread the spilled mercury and generate vapor. The vacuum will also become contaminated and will be considered hazardous waste.

Non-Porous Surfaces

- Carefully pick up any broken glass. Sharps such as broken thermometers that have contained or still contain mercury must be placed in a separate container and labeled as mercury-containing hazardous waste.
- Working from the edge of the spill inward, use a card or scraper to push the mercury droplets together into a larger drop.
- Aspirate larger droplets using a suction device such as a Pasteur pipet or syringe with no needle or carefully transfer the droplets directly into a plastic container with a sealable lid (screw-top vial, empty plastic jar, film canister, etc.).
- Use the suction device to get material out of cracks.

Non-Porous Surfaces, continued

- Pieces of masking tape or duct tape may be used to pick up tiny droplets.
- An anti-static spray may help to release tiny droplets.
- Use a flashlight in reduced-light areas to detect missed mercury. Scan parallel to the floor.
- A mercury sponge may be used to take up small amounts of material on flat surfaces. Follow directions included with the kit.
- Commercial mercury-absorbent powder may be used to amalgamate remaining residue. Sprinkle powder over area, spray with water mist or recommended activator, scrape into a paste, and wipe up with damp paper towels.
- Commercial mercury “wipes” may be used as a final step to remove residue from cleaned surfaces.
- Place all trash, PPE, etc, into a zip-tip bag or a plastic waste bag. Double bag and secure, then place into a box. Seal the box and affix a hazardous waste label identifying the material as “mercury spill debris.”

Porous Surfaces

- Contaminated items should be disposed of as hazardous waste.
- Affected area of a carpet may be cut out and replaced.
- Seek advice from EHS if mercury is spilled on other porous surfaces.

Factors That Can Complicate Spill Response

- Heated spills can be an inhalation hazard. If spilled in hot equipment, leave area and return when equipment is cool.
- Seek advice from EHS if spills larger in quantity than the amount in a broken mercury thermometer occur.
- Dimpled or uneven surfaces can increase the difficulty of collecting droplets.
- For spills in hard-to-reach areas such as behind cabinets, consult with EHS.
- Do not use a vacuum cleaner because it will become contaminated and will be considered hazardous waste. Vacuuming will also cause the mercury to spread and exhaust mercury vapor into the air.

Spill Kits (Spill Response Supplies)

Have spill kits (supplies) on hand in areas where hazardous materials are used. Preparation of a spill kit consolidates spill control materials and personal protective equipment in one location. Tailor each spill kit to meet the needs of each work area. PPE must be selected based on the hazardous materials used. Store kits in a location where individuals can quickly gain access to items needed in the event of a spill. Hazardous materials users should know where to locate the spill kit and how to use the spill response materials contained in the kit.

Basic Spill Kit Supplies

Container

Obtain a chemical-resistant container to hold the kit contents such as a 5-gallon plastic bucket or Rubbermaid™ tub. It is recommended that an additional 5-gallon container be on hand that has a sealable lid.

Personal Protective Equipment (minimum)

- 2 pairs chemical splash goggles.
- 2 pairs chemical-resistant gloves. Silver Shield®/4H® and thick nitrile or neoprene gloves are recommended.
- 2 pairs plastic, vinyl or rubber shoe covers.
- 2 disposable lab coats, aprons, or coveralls.

Absorption Materials

Include universal absorbents such as commercial spill pads, pillows, spill socks, and loose absorbents. Examples of commercial universal absorbents are MagicSorb™, Wyk® Safety Sorbent, 3M™ Chemical Sorbent, Chemsorb®, Pig® Absorbent Pads, or Hazorb®.

Cleanup Tools and Materials

- Plastic scoop, dust pan, or shovel. Use plastic (polypropylene) when non-sparking tools are needed.
- Plastic broom or brush for solids (polypropylene).
- 3-5 thick, heavy duty waste bags. DO NOT use red biohazard waste bags for non-biohazard spill debris.
- Cardboard box to hold waste bag containing spill debris.
- Sealing tape.
- EHS hazardous waste labels.
- Forceps or tongs for picking up broken glass or other sharps.
- Detergent or general cleaner for final cleanup.

NOTE: Use disposable supplies when possible because contaminated cleanup tools are considered hazardous waste.

Additional Spill Response Items as Necessary for your Work Area

- Additional PPE such as face shields, chemical-resistant clothing or boots.
- Neutralizing agents.
 - General neutralizing agents for acids and bases (see “Absorbents and Neutralizers” chart).
 - Chemical-specific neutralizers such as those for formaldehyde or solvents (see “Absorbents and Neutralizers” chart).

- Mercury spill response items (see Module II).
- Specialized supplies for air or water-reactive chemicals and hydrofluoric acid.
- Bleach, if biological agents are used.
- Specialized supplies if radioactive materials are used.

Absorbents and Neutralizers Chart

GENERAL CHEMICAL SPILLS			
Absorbents	Universal – Pads, Pillows, Granular, and Loose Sorbents such as - Magic Sorb™, Wyk® Safety Sorbent, Hazorb®, Chemsorb® [Do Not Use with HF] 3M™ Chemical Sorbent, Pig® Absorbent Pads [Okay for use with HF]		
Additional Information	<ul style="list-style-type: none"> • These universal/commercial absorbents may be used for most liquid chemical spills. • Check the product label or other manufacturer's information for recommended uses and compatibility. 		
CORROSIVES - Acids			
Neutralizers	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> Weak bases <ul style="list-style-type: none"> • Sodium carbonate (soda ash) • Sodium bicarbonate • Calcium carbonate </td> <td style="width: 50%; vertical-align: top;"> Commercial neutralizers <ul style="list-style-type: none"> • Spill-X-A® (purchase pH paper separately) • Neutrasorb® (has built-in pH indicator) </td> </tr> </table>	Weak bases <ul style="list-style-type: none"> • Sodium carbonate (soda ash) • Sodium bicarbonate • Calcium carbonate 	Commercial neutralizers <ul style="list-style-type: none"> • Spill-X-A® (purchase pH paper separately) • Neutrasorb® (has built-in pH indicator)
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Additional Information	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> Okay to neutralize <ul style="list-style-type: none"> • Hydrochloric acid • Sulfuric acid • Nitric acid • Phosphoric acid </td> <td style="width: 50%; vertical-align: top;"> Do not neutralize <ul style="list-style-type: none"> • Acids that contain heavy metals • Oxidizing acids such as chromic acid, perchloric acid, and fuming nitric acid </td> </tr> </table>	Okay to neutralize <ul style="list-style-type: none"> • Hydrochloric acid • Sulfuric acid • Nitric acid • Phosphoric acid 	Do not neutralize <ul style="list-style-type: none"> • Acids that contain heavy metals • Oxidizing acids such as chromic acid, perchloric acid, and fuming nitric acid
Okay to neutralize <ul style="list-style-type: none"> • Hydrochloric acid • Sulfuric acid • Nitric acid • Phosphoric acid 	Do not neutralize <ul style="list-style-type: none"> • Acids that contain heavy metals • Oxidizing acids such as chromic acid, perchloric acid, and fuming nitric acid 		
CORROSIVES - Bases			
Neutralizers	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> Weak acids <ul style="list-style-type: none"> • Citric acid • Sodium bisulfate • Dilute acetic acid (vinegar) </td> <td style="width: 50%; vertical-align: top;"> Commercial neutralizers <ul style="list-style-type: none"> • Spill-X-C® (purchase pH paper separately) • Neutrakit®-2 (has built-in pH indicator) </td> </tr> </table>	Weak acids <ul style="list-style-type: none"> • Citric acid • Sodium bisulfate • Dilute acetic acid (vinegar) 	Commercial neutralizers <ul style="list-style-type: none"> • Spill-X-C® (purchase pH paper separately) • Neutrakit®-2 (has built-in pH indicator)
Weak acids <ul style="list-style-type: none"> • Citric acid • Sodium bisulfate • Dilute acetic acid (vinegar) 	Commercial neutralizers <ul style="list-style-type: none"> • Spill-X-C® (purchase pH paper separately) • Neutrakit®-2 (has built-in pH indicator) 		
FLAMMABLE LIQUIDS and SOLVENTS			
Absorbents	<ul style="list-style-type: none"> • Spill-X-S® • Solusorb® • Activated charcoal 		
Additional Information	<ul style="list-style-type: none"> • Absorbents reduce vapor level. • Degree of flash point reduction depends on quantity used. Refer to manufacturer's directions. • Absorbents may also be used for other toxic, noxious liquids such as carbon tetrachloride and chloroform. • Do not use these absorbents with oxidizing liquids. 		
FORMALDEHYDE			
Neutralizers	<ul style="list-style-type: none"> • Commercial products • Spill-X-FP® • Spilfyter® Formaldehyde Polymerizer 		
Additional Information	<ul style="list-style-type: none"> • Neutralizers reduce vapors. • Reacts with aqueous formaldehyde solutions to form a solid polymer. 		
MERCURY METAL			
Absorbents	<ul style="list-style-type: none"> • Do not use general/universal absorbents. • Collect liquid with a suction device such as Pasteur pipette. 		
Neutralizers	<ul style="list-style-type: none"> • Treat residue with amalgamating material such as zinc powder or use a commercial product such as mercury sponges or powder. • Use treatment product <i>only</i> after collecting as much liquid as possible using a suction device. 		
Additional Information	<ul style="list-style-type: none"> • Amalgamating material will reduce vapor by forming mercury compounds. May need to be activated with water or commercial activator solution. 		

Potential Hazards

- Check for flammability. If flammable or combustible, refer to “Flammable/Combustible Liquids” guidance.
- Some of these materials may burn but are not readily ignitable.
- Contact causes irritation or burns to skin or eyes.
- May be toxic if inhaled, swallowed, or absorbed through skin.
- Heat and/or fire may produce irritating or poisonous gases.

Basic Supplies (See EHS Spill Preparedness and Response Training for additional information)

Materials

Absorbent pads, pillows, or loose sorbent; OR
Solvent absorbent such as Spill-X-S or
Solusorb (Solusorb may be used for non-
oxidizing liquids, only)

PPE

Splash goggles
Lab coat or apron
Shoe Covers (optional)
Chemical-resistant gloves

Waste Handling

Sealable container
Non-sparking (plastic) mixing tools
Heavy duty waste bags
Tape to seal bags
Hazardous waste labels

Response Actions/Cleanup Methods

- Alert others in the spill area.
- Don't touch or walk through the spilled material.
- Based on the material and quantity spilled, assess the potential volatility and safe exposure limit.
 - Isolate the area and vent vapors only to the outside. Alert others if this is not possible.
 - Wait a few seconds to allow any aerosols generated during the spill to settle before beginning cleanup and take care not to generate aerosols during cleanup by avoiding vigorous wiping.
- Wear eye and skin protection. Choose gloves that are compatible with spilled liquid. Silver Shield®/4H® gloves are a good general choice.
- Avoid breathing vapors.
- Dike the spilled liquid to prevent spreading. Universal absorbent such as spill pads, pillows, or a general absorbent material may be used.
- Cover the spill area with a universal absorbent and absorb all spilled material. Spill-X-S®, Solusorb®, or other activated charcoal may be used for volatile solvents to reduce vapors. (DO NOT use charcoal with oxidizing materials!)
- Pick up spill cleanup materials with plastic tools and place them into a plastic or glass container with a sealable lid.
- Label material for collection by EHS.
- Thoroughly ventilate the area after the cleanup.
- Clean the area with detergent and water after the spill cleanup.

Factors That Can Complicate Spill Response

- Spilled toxic/poisonous or irritating liquids may become a major spill due to a large quantity spilled, a complex situation such as multiple chemicals spilled or involved in a spill, or if special respiratory protection is required for response.
- Special respiratory protection may be required if there is an inhalation hazard due to –
 - Increased toxicity/volatility.
 - Severe short term health effects.
 - Highly volatile or toxic materials spilled in poorly ventilated areas. For example, a large quantity of 37% formaldehyde solution would be volatile, combustible, and have severe short-term health effects.

- Chemicals with strong or irritating odors, such as chemicals labeled “stench” or lachrymators may affect an entire building in a short time if contaminated air is recirculated. A small quantity spill could be mistaken for a gas leak and result in emergency evacuation of a building. If these types of chemicals are spilled, alert others and, if possible, quickly move the spilled material to a fume hood. If a fume hood is not available, double-bag or triple-bag waste and tightly close to control odor. For example, beta-mercaptoethanol has a very strong “rotten-egg” odor and is considered a “stench” chemical.

Potential Hazards

- Check for flammability or water-reactivity.
- Contact may cause burns to skin or eyes.
- May be toxic if inhaled, swallowed or absorbed through skin.
- Heat and/or fire may produce irritating or poisonous gases.
- Airborne particles that could be inhaled may be generated when solids are disturbed.

Basic Supplies (See EHS Spill Preparedness and Response Training for additional information)

Materials

Absorbent towels or wipes
Spray bottle of water

PPE

Splash goggles
Lab coat or apron
Shoe Covers (optional)
Chemical-resistant gloves

Waste Handling

Sealable container
Spatula
Dustpan
Heavy duty waste bags
Tape to seal bags
Hazardous waste labels

Response Actions/Cleanup Methods

Toxic or irritating solids/powders can potentially generate airborne particles during the cleanup process. If not controlled, these airborne particles may become an inhalation hazard. Care is needed to use a cleaning method that suppresses dust/particle generation. Generally this is accomplished by dampening the solid with a water mist (if the material not water-reactive) or by covering the material with a damp paper towel and using this for the cleanup.

- Determine if solid/powder is flammable or water-reactive.
 - If flammable, shut off ignition sources, flames and use non-sparking tools such as plastic.
 - Control water-reactive solids/powders with sweeping compound to minimize dust without the use of water.
- Use gloves and safety goggles.
- If material is not water-reactive, dampen lightly (such as with spray bottle of water) to prevent airborne dust.
 - If the material is light and fluffy, spray above the solid and allow the mist to settle directly on the spilled material and mix carefully.
 - If the material is less dusty, you can add a small amount of water directly to the spilled material and mix carefully. (Avoid adding water to corrosive solids unless the material is light and dusty enough to create an inhalation hazard because splattering may occur and the skin contact hazard increases.)
- Alternatively, carefully place a damp paper towel or other wetted wipe over the spilled material. The moisture in the towel will help minimize dust generation.
- Carefully push solids into a dust pan or container.
 - The material may be picked up using only the damp towel or by using the damp towel along with a plastic spatula.
 - Alternatively, two plastic spatulas may be used to push and lift moistened material into waste container.
 - Use a brush only for non-dusty solids. If a brush is used, proceed carefully to prevent raising airborne dust.
 - Use non-sparking (plastic) tools for flammable solids.
- Clean the area with detergent and water after the spill cleanup.

Factors That Can Complicate Spill Response

Reactive materials require advance planning to determine the appropriate method to safely clean up a spill. For example, spontaneously combustible materials may need to be covered with oil to protect from air. Check MSDS and manufacturer recommendations for your specific material.