



Guidance Note

May 2007

Flammable Spills

HWG-022

This information is for your use and as a way of providing consistent information. There is no response required.

FLAMMABLE SOLVENT SPILL PROCEDURE

For flammable liquid spills, the properly trained UCDHSC emergency coordinator should be aware of the following guidelines:

1. Restrict access into the spill area. Consider the potential for personnel exposures to the substance, and decide whether the fire department should be called.
2. Do not attempt to cleanup large flammable solvent spills (5 gallons of ethanol) which have a flash point below room temperature because of the potential for a large scale fire. The fire department should be called for large-scale spills of flammable solvents because they have fire resistant suits which offer protection against fires.
3. Highly volatile solvents such as ethyl ether or methylbutane evaporate extremely quickly. It may be more practical to allow small quantities of these solvents to evaporate rather than to risk exposure to a fire attempting to clean them up. Consider whether the ventilation available will be enough to remove these substances.
4. Remove or eliminate all sources of ignition (Bunsen burners, ovens, electric motors, etc.) prior to cleaning up a spill of flammable solvent.
5. Use the MSDS or chemical manufacturer's information as a guide and then determine appropriate PPE.
6. For handling small spills of flammable solvent, surround and absorb the spill with an appropriate absorbent such as diatomaceous earth (Ultrasorb 248) to prevent further spread. Employees with more chemical knowledge should consider using charcoal (or Solusorb) to absorb flammable solvents (do not use with strong oxidizing or reducing agents).
7. Place enough absorbents (pads or granular material) over the spill to completely absorb all of the liquid.
8. Collect the debris with a plastic shovel or dustpan and place it into a sealed plastic waste container and close the lid. Wipe up the remaining residue with an appropriate solvent. Soap and water will be adequate for most water-soluble solvents.
9. The room should be cleared with a detector tube before people are allowed to occupy the space. If you do not have a detector tube to clear the room, allow the room plenty of time to properly air out, or use a portable fan.
10. Properly label the waste container with a hazardous waste label including the date of accumulation. Leave a note on the waste container indicating the circumstances of the spill and notify the hazardous waste manager for final disposal.

Flammable Liquids Overview

There is always the danger of fire when cleaning up a flammable solvent spill. "Flammable" liquids generate vapors at any temperature below 100⁰ F. Even at room temperature (75⁰ F) or lower, most flammable liquids produce enough vapors to cause a fire if an ignition source is present. An ignition source could be a flame, static electrical discharge, or an electrical spark from a motor.

Flammable solvent spills are usually absorbed with granular charcoal (Solusorb) or other absorbents. Since many of the absorbents contain charcoal, care must be taken to not mix it with either strong oxidizing or reducing agents. **MIXING CHARCOAL WITH EITHER A STRONG OXIDIZER OR REDUCING AGENT MAY CAUSE A FIRE OR EXPLOSION.** Diatomaceous earth (Ultrasorb 248) may be used to absorb a flammable liquid if you are unsure of its oxidizing/reducing potential.

Do not apply an absorbent to a flammable liquid spill of greater than one gallon unless a trained responder is standing by with a portable fire extinguisher. It may not be safe (fire or explosion hazard) to enter a room where a significant amount of a low flash point solvent has been spilled without wearing full fire protective clothing. If the flammable liquid spill is one gallon or more the fire department should probably be called to assist with the spill.

Many flammable solvents are toxic by skin absorption and inhalation. Proper protective clothing must be worn when handling these materials.

Do not use metal shovels or equipment to cleanup a flammable solvent spill because they may cause a spark. Use plastic shovels and dustpans for cleaning up the spill residue.

Be aware that the concentration of the solvent in the breathing zone may increase as the residue is cleaned up. Disturbing flammable solvents in the cleanup process will most likely increase the vapor concentration.

Many flammable solvents will dissolve asphalt floor tile. Depending on the chemical, the floor tile from a spill site may have to be removed to eliminate lingering odors (e. g. pyridine). Be aware that floor tiles and mastic are sometimes made of asbestos and removing them carelessly may cause an asbestos release. You must have an asbestos contractor remove asbestos floor tiles (most 9 inch tiles).

Common Flammable Solvents

Acetone, acetonitrile, amyl alcohol, benzene, butanol, ethanol, dichloroethane, ethyl acetate, gasoline, hexane, heptane, isopropanol, lacquer thinner, methanol, methylbutane, methyl ethyl ketone (MEK), methyl methacrylate, octane, petroleum ether, piperidine, propanol, propylene oxide, psuedocumene, pyridine, triethylamine, tetramethylethylenediamine (temed), toluene, xylene.

Flammable Peroxidizable Solvents (explosive hazard)

Atmospheric oxygen reacts with ether and a limited number of chemical solvents which have chemical structures that favor the formation of unstable peroxide compounds. The peroxide structure is usually very unstable, and opening or bumping a container which has a significant peroxide content may cause an explosion. The rate at which atmospheric oxygen combines with the solvent to form peroxide compounds depends on the following: the chemical structure of the solvent, how often the container was opened, whether the lid is loose, whether the solvent was distilled (which removes the inhibitor, usually hydroquinone or BHT or if it has been exposed to light). Light may also cause peroxidizable solvents to form free radicals which also form unstable peroxide structures. Peroxidizable solvents should always be stored in opaque containers or in clear bottles covered with tin foil.

Do not touch a container of peroxidizable solvent if there are crystals around the lid or if significant solids are visible inside the container because the container may explode. Isopropyl ether forms peroxides very quickly and solid debris does not have to be visible in order there to be an explosive hazard. The most common cause of peroxide explosions is when organic solvents such as ethyl ether are distilled and the peroxide rich residue which is left over in the pot is overheated.

Flammable peroxidizable solvents include: acetaldehyde, acetal, acrolein, cumene (isopropylbenzene), cyclohexene, dioxane, ethyl ether, furan, isopropyl ether, styrene, tetrahydrofuran, divinyl ether, and vinyl pyridine. Potassium metal also forms explosive peroxides when exposed to air (oxygen).