



Increase your bottom line: Manage cleaning solvents better

Introduction

Pollution prevention, P2, doesn't always mean a change in technology or raw materials, especially with solvent management. P2 can be achieved through engineered process changes and sound administrative controls using site-specific best management practices (BMP's) to minimize solvent losses. Most solvents are high in volatile organic compounds (VOCs) that directly contribute to the formation of harmful ozone. Ozone levels in several parts of our state, especially the Wichita five-county metro and Kansas City areas, are creating a public health concern. As a community, if we don't take proactive steps to reduce these emissions, our state and businesses may be faced with regulatory controls.

Administrative controls

Engineered controls are the preferred method of controlling solvent loss and reducing employee exposures to harmful chemicals. Engineered controls, which are "built in" to the process, better ensure the safety of workers and result in less solvent use and/or losses. The type and extent of control methods depend on physical, chemical and toxic properties of the material, and processes involved in its use. Although the type of engineered controls used can vary greatly from operation to operation, the following general methods are used:

- Substitute a less harmful material for the hazardous material;
- Change or alter the process flow to minimize or eliminate solvent use;
- Isolate, enclose or close loop the process.

Substitute

The easiest way to reduce pollution and eliminate liabilities is to use non-hazardous substitutes in place of hazardous solvents. This option may include the following:

- Make sure it really needs to be cleaned
- Use blasting media

- Use water-based cleaners
- Use other chemical solvent

Substitution with other chemical solvents usually doesn't eliminate use of hazardous solvents, but it may be necessary when other cleaning approaches prove unsatisfactory.

Change the process

Companies should examine processes that could be altered to reduce or eliminate solvent use. Such process changes may include these steps:

- Brush cleaning or wipe cleaning;
- Change the material flow or inventory times to eliminate corrosion formation that would have to be removed, changing upstream process to eliminate the use of materials or coatings that later have to be removed from the part;
- Improve maintenance practices.

Process changes may also focus on use of new technologies such as vacuum de-oiling, enclosed batch degreasers, or ultrasonic cleaning systems to reduce the use of hazardous solvents.

Close the loop

Some processes can be re-engineered to incorporate closed systems or automated systems to reduce evaporative losses and personnel exposures. As much as 90% of solvent used in conventional open-top vapor degreasers can be lost due to air emissions. By totally enclosing the system, slowing down the rate of entry into the solvent with manual hoists, installing flat or rolling covers, increasing the freeboard height, or by refrigerating the freeboard, companies can significantly reduce solvent losses.

Best management practices

Engineered controls of solvent losses, while very efficient, usually do require more capital investment than administrative controls, which involve work practice changes. Administrative controls can be implemented

with very little or no capital investment, yet offer impressive opportunities for companies to reduce solvent losses and wastes. The following recommendations identify administrative controls and best management practices to reduce solvent use and employee exposures to solvent vapors.

Keep vapors contained

- Keep doors to mixing/storage areas closed at all times.
- Store and transport solvent only in approved safety containers.
- Properly label all solvent containers to indicate their contents; hazards; and proper use, storage, and disposal.
- Read container labels and follow the directions.
- Keep solution containers closed tightly when not in use.
- Avoid unnecessary transfer or movement of solutions.
- Keep tanks and reservoir tanks covered when not in use.
- Keep solvent solution at the appropriate temperature.
- Minimize sludge in the solvent tank; remove sludge as often as possible to extend solvent life.

Minimize chances of spills and leaks

- Use secondary containment wherever possible.
- Develop and follow procedures for detecting solvent leaks from process equipment, holding tanks, and spill control devices.
- Frequently inspect process equipment, holding tanks, and spill control devices for cracks, loose parts, and other possible sources of leaks. Set up a tracking schedule to make sure inspections are a routine practice.
- Where spills occur, follow established procedures for containing them.
- Clean up all spills and leaks as quickly as possible.
- Place rags, waste, paper towels, or absorbent used to clean spills in a closed container (preferably a non-aluminum, all-metal safety container) immediately after use.

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- Make sure leaks are repaired and spills cleaned up by employees trained in proper cleanup methods. These employees should wear appropriate personal protective equipment (PPE).

Minimize solvent use

- Determine how clean is clean and establish guidelines to avoid excess cleaning.
- In a plant setting, issue predetermined solvent quantities to technicians and track its use by different technicians. This can help identify high solvent needs or overuse.
- Keep tight-fitting lids on virgin solvent containers or solvent baths when not in use to avoid loss due to evaporation.
- Use plunger or dauber cans that release metered amounts of solvent on rags, instead of squeeze bottles or solvent buckets.
- For parts with heavy soil, consider a two stage cleaning process to extend solvent life. First clean the part in used solvent. Then clean the part in less-used or virgin solvent.
- Change or alter process flow to minimize or eliminate some solvent cleaning needs.
- Replenish solvent bath only when indicated by monitoring results.
- Remove parts from solvent slowly to reduce dragout losses.

Remember: Pollution prevention (P2) doesn't have to cost companies money. Management commitment, positive attitudes, and increased awareness of waste generation are the beginning steps for all companies. Using BMP's to reduce wastes leads to greater savings and opportunities for companies to achieve more with less. For more information on recommended BMP's and P2 for a specific industry, contact the Pollution Prevention Institute, providing technical assistance to Kansas businesses as part of the Kansas Small Business Environmental Assistance Program. Call 800-578-8898 or e-mail us at sbeap@ksu.edu.

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