FACT SHEET

Pollution Prevention Tips – Solvent Use

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Online Resources Available for Facilities to Reduce Use of Hazardous Solvents NYSDEC's Pollution Prevention (P2) Unit is offering guidance and resources for finding alternatives to reduce environmental, health, and safety impacts associated with solvents.

Solvent Uses

Solvents are substances that are used to dissolve other substances and vary widely in their chemical makeup. They can be as simple as pure water, or may be composed of a mixture of chemical compounds. They also have numerous commercial and industrial applications. For example, manufacturers commonly use solvents to clean parts and equipment to remove grease, soils, adhesives, or other foreign matter. This can be accomplished by soaking, wiping, spraying, or immersion. Solvents can also be used to disperse substances within a solution, such as the pigment particles in paints and inks. They may also contribute molecules to a drug compound during the manufacturing of pharmaceuticals.

However, despite their utility in manufacturing, many solvents can be hazardous to the health and safety of workers, and can harm the environment if not handled and disposed properly. Further, even when managed in compliance with all applicable standards, some may emit volatile organic compounds (VOCs) that contribute to the formation of ground-level ozone pollution. Therefore, it is often best to avoid using most solvents by finding alternative chemistries or processes that are less hazardous.

KEY POINTS

Solvent Reduction

Companies can avoid or reduce the use of hazardous solvents in the following ways:

- *Product Redesign* – modify your product or service so that its manufacture is less reliant on solvents
- *Chemical Substitution* – find solvents that are non-toxic, non-VOC alternatives
- *Process Modification* – use alternative removal methods that don't require solvent, or use less solvent
- *Closed-Loop Recycling* – reclaim spent solvents and reuse them within the process

Pollution Prevention Resources

There are a number of ways that facilities can reduce or completely eliminate their use of hazardous solvents. The following conceptual framework can provide a starting point for facilities looking to reduce solvent use at their facilities:

Product Re-Design – Taking a step back and looking at ways to improve your end-product can result in other improvements at your facility as well. For example, reducing the size or surface area of a product can reduce the need for solvents during its production.

Chemical Substitution – Reviewing the ways in which solvents are used at your facility can help you find alternatives that serve the same purpose, but that are also less toxic, and meet any applicable regulatory requirements. Several online tools, such as those provided below, offer ways to compare the properties, uses, and hazards of numerous solvents in order to find the best alternative.

Process Modification – In cases where solvents are used to remove foreign matter, alternative means of removal can be accomplished by mechanical or thermal processes. Blasting, abrasion, high-pressure water sprays, steam, and freezing are some of the many ways that processes can be changed to reduce solvent use. Innovative technologies, such as vacuum cycle nucleation (see next page) may also meet your needs.

On-site or Closed-Loop Recycling – Some facilities dispose batches of cleaning solvent after a single use. It is best to consider reusing a solvent within the process until it is fully "spent" and no longer useful. This is often achieved by measuring the solvent's properties, such as % solids or viscosity, to determine whether it can be recycled back into the process. This P2 measure can greatly reduce the consumption of fresh solvents.

The resources below are provided to assist facilities in evaluating alternatives to their current solvents in order to find equally-effective, less toxic alternatives. Each resource below is followed by a description of how it can be used to assist in the decision-making process:

- **EPA's Guide to Cleaner Technologies – Organic Coating Removal**

  This guide was developed by EPA for facilities looking to switch from chemical-based paint and coating removal operations to mechanical or thermal operations. The guide offers descriptions of the various replacement technologies and mechanisms, as well as their benefits and limitations.

- **Massachusetts Toxics Use Reduction Institute's (TURI's) Cleaner Solutions Database**

  A database that facilities can use to evaluate less-toxic alternatives to many commonly used solvents. The database can be used to find replacements based on the type of substrate, the contaminant being removed, the application method and other criteria. When determining whether a replacement will be less hazardous than its predecessor, it is important to review the Safety Data Sheet (available via the database) to determine the toxicity and other applicable hazards associated with its use.

- **EPA's Safer Chemical Ingredients List**

  A list of chemicals that are categorized by their functional use, and which provides color-coded icons that can help facilities find safer alternatives to hazardous solvents used in cleaning processes. Again, facilities should consult Safety Data Sheets to determine toxicity and other hazards.

- **NEWMOA P2 Technology Profile - Enclosed Spray Gun Washers Using Alternative Cleaners**

  Information about enclosed spray gun washers that use alternative cleaners which reduce hazardous chemical use and the generation of hazardous waste and air emissions. This study focuses on the potential benefits of enclosed spray gun washers using alternative cleaners when compared to traditional spray gun cleaning systems.

- **New York State Pollution Prevention Institute's (NYSP2I's) Vacuum Cycle Nucleation Case Study**

  A case study detailing an innovative technology that may serve as a replacement for many cleaning processes that rely on toxic solvents. For more information, interested facility operators can contact NYSP2I (see link under "Contact Information".

Please note that the resources provided above are meant to serve as helpful tools in finding alternative cleaning solvents or processes. However, not all of the alternatives contained in these resources are guaranteed to achieve compliance with all regulations, so facility operators are responsible for carefully evaluating the available information with respect to the regulatory requirements.

Further Assistance

New York State Pollution Prevention Institute (NYSP2I)

NYSP2I offers direct assistance to New York State businesses that need help finding economical pollution prevention measures that work for their facility. NYSP2I is based at the Rochester Institute of Technology and has a team of experts that can work with facilities to reduce their use of toxic solvents and save money. To find out more, please visit their website at the link provided below. Please consider contacting them for confidential pollution prevention assistance.

http://www.rit.edu/affiliate/nysp2i/

For additional information on any of the above resources or alternatives, please contact NYSDEC's P2 Unit using the contact information below.

CONTACT INFORMATION

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