

WASTE REDUCTION FACT SHEET

Up-to-the-minute waste reduction techniques and technologies



NC Division of Pollution Prevention
and Environmental Assistance
NC Department of Environment, Health, and Natural Resources

Waste and Cost Reduction Techniques for Small Parts Cleaners

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Mechanical components typically need cleaning during repair and maintenance activities, and most maintenance shops use parts washers to clean metal components. These small parts washers are usually batch, "stand-alone" units that consist of a cleaning basin, a solvent reservoir, and a solvent recirculation system. Solvent capacity can range from 3 to 45 gallons. Parts cleaners are used by a variety of facilities from small automotive service stations to maintenance departments at large industrial facilities.

Parts Cleaning in a "Stand-Alone" Unit

In a "stand-alone" unit, dirty parts are rinsed with a solvent while the operator brushes oils, soils, or grease from the parts. Some parts cleaners have agitators to assist the cleaning process. Automatic immersion systems, which are also available for small parts, free up an operator's time during the cleaning cycle.

Typical Parts Cleaning Solvents

Most parts cleaners use petroleum-based, low-flash-point solvents such as mineral spirits or Varsol™. These flammable solvents have a flash point of approximately 100 °F and must be handled as hazardous waste when recycled or disposed.

Recently, solvents with higher flash points (>140 °F) and aqueous alkaline cleaning solutions (detergents) have become available for small parts

washers. If they do not become contaminated to the extent that they meet the definition of a hazardous waste, both these higher flash point cleaners have the potential to eliminate hazardous waste disposal costs associated with spent solvents.

Reducing Waste and Costs of Solvent Parts Cleaners

Increasing Solvent Life

The following measures can help a company extend the life of the solvent in a parts cleaner, save money, and reduce hazardous waste generation.

1. Examine cleaning needs and avoid cleaning parts when possible.
2. As a preliminary cleaning, use wire brushes, squeegees, or scrapers before a dirty part is placed in the parts cleaning basin.
3. Extend the time between solvent servicing. Many companies have found that periods between solvent change-outs can be extended without any appreciable change in cleaning quality.

Filtering Saves Money and Reduces Waste

Solvent life can be greatly extended through the use of filtration systems. Cartridge filters can be fitted to an existing system, and some suppliers sell parts washers already equipped with filters.

Such systems are designed to remove particles with maximum diameters of 5 to 100 microns (μ). A 5- μ filter system not only can increase solution life from 350 to 600 percent, it can also reduce a company's hazardous waste stream by 50 to 80 percent. The life of a 5- μ filter cartridge varies between 4 and 12 weeks, depending on the application. Some companies claim that solvent life can be extended to more than 3 years by a filter. Varying with size, filter systems cost from \$60 to \$150, and replacement cartridges cost less than \$10. Often, the spent filter cartridge can be disposed by the same process as an oil filter if it contains no hazardous waste, or the company's current hazardous waste servicer can handle the spent cartridges.

Other types of fluid/particle separators are available for small parts cleaners. Solvent life can be doubled by cyclonic separators that remove soils through centrifugal action. Cyclonic filters are typically cleaned out and maintained by the service company from which the equipment is leased.

Solvent Alternatives With Higher Flash Points

A number of suppliers offer solvents with flash points above 140° F, which is the ignitability limit defined as hazardous by RCRA. These solvents (light aliphatic naphthas or hydrotreated light petroleum distillates that have been processed or blended to have a flash point above 140° F) typically have lower evaporation rates and less odor and may dry at a slightly slower rate than conventional solvents. Similar to lower flash point solvents such as mineral spirits and Varsol™, the solvents with higher flash points can be used to clean oils, greases, and soils from all type of metals.

The higher flash point solvents usually are more costly than mineral spirits or Varsol™, but they offer the advantage of being non-hazardous (unless they are contaminated and, thus, become hazardous). This non-hazardous status is particularly important in view of a hazardous waste generator's full "cradle to grave" responsibility for the proper disposal of any hazardous waste. Although the cost of disposing a spent non-hazardous solvent will likely be about the same as that for disposing a hazardous solvent through a waste service, the spent non-hazardous solvent will reduce a company's hazardous waste management requirements and liability. When considering a switch to a higher flash point solvent, a company may find it advantageous to investigate the combination of higher flash point solvent and a filtration system to extend solvent life, reduce waste, lower potential liability, and save money.

Maintaining Non-Hazardous Status of Spent Solvent

Although "fresh" higher flash point solvents (> 140° F) are not considered hazardous under RCRA, measures must be taken to prevent the spent solvent from becoming hazardous. A higher flash point solvent can become a spent hazardous waste if it is contaminated with the following:

- Any amount of a RCRA F-listed solvent (F001-F005) such as any chlorinated solvent (Methylene Chloride, 1,1,1-Trichloroethane, Trichloroethylene, etc.) or a non-halogenated solvent (Methyl Ethyl Ketone, Toluene, Benzene, etc.);
- A RCRA D-characteristic heavy metal such as Chromium, Cadmium, Lead, etc., in concentrations that would fail a TCLP toxicity test; or
- A substance with a low flash point (< 140°F) such as, Naphtha, Mineral Sprits, gasoline, or kerosene in sufficient quantities to lower the flash point of the entire batch of cleaning solvent.

To avoid this type of contamination:

1. Inventory maintenance shop chemicals for F-listed solvents. The best way to avoid contamination is to conduct an inventory of solvents and

chemicals used in the maintenance area. For example, certain brake cleaners contain 1,1,1-Trichloroethane, an F-listed solvent. If this brake cleaner is used in the part washers, the entire batch of solvent would be considered hazardous, according to the mixture rule, and must be managed as a hazardous waste. However, many alternative brake cleaners are available that do not contain F-listed solvents and provide good cleaning .

2. Find replacements for any F-listed solvents used in the maintenance area.
3. Eliminate the use of these solvents to avoid any possibility of contamination.
4. Instruct employees not to pour or spill any liquids into the washer that could lower the flash point of the entire solution.
5. Review the type of material being cleaned. For example, if lead soldered parts are being cleaned, the solvents may fail a TCLP toxicity test for lead and, thus, be considered hazardous waste.

Non-Hazardous Disposal Options

Even if a spent high-flash-point solvent is characterized as non-hazardous, the solvent must be handled through a solvent servicer for recycling, fuel blending, or incineration. Options may also be available for on-site fuel blending. The North Carolina Hazardous Waste Section at (919) 733-2178 can provide more information on hazardous waste management.

Alternative Aqueous Parts Cleaners

Aqueous-based alkaline cleaners (detergents) are available for use in parts washer units. For these cleaners to be used, parts must be immersible in water without serious flash rusting problems. If flash rusting is problematic, additives are available for these aqueous solutions. Aside from this disadvantage, many aqueous cleaners are non-hazardous (i.e., they have a pH > 2 and < 12.5), non-flammable, non-toxic, and phosphate-free.

Types and Costs of Aqueous Parts Washers

Aqueous parts washers can be enclosed immersion tubs or open basins similar to solvent-based cleaning units. Enclosed tub systems offer the advantage of automatic, unattended parts cleaning in 5 to 10 minutes. Some systems spray the solution under pressure and are heated to expedite parts cleaning and drying, while others are cold units with longer drying times. Aqueous washers are usually stainless steel and range in capacity from 6 gallons and higher.

To extend the life of an aqueous solution, oil skimming can be performed either manually or by a unit installed to remove oil. Solution life varies from 3 weeks for heavy use to 4 months for lighter applications. A typical batch of solution for a 30-gallon unit requires 4 pounds of powdered cleaner and will cost between \$28 and \$44. As with solvent-based systems, filter systems can extend bath life. Aqueous filter systems can, in some instances, be rinsed several times before a new cartridge must be purchased. Typical operating costs for a 30-gallon aqueous parts washer range between \$4 to \$6 per day as opposed to \$5 to \$6 per day for solvent systems without filtration.

Disposal of Aqueous Solutions

Potential disposal options for spent aqueous-based solvents include (1) discharge to a local sewer system, (2) pre-treatment of the aqueous solution and then discharge, or (3) off-site disposal by a waste servicer. A company should check with the local wastewater pretreatment coordinator before discharging any spent aqueous cleaner. Some vendors of small aqueous cleaners also offer off-site disposal services. The same rules discussed above for maintaining the non-hazardous status of spent solvents apply for preventing the contamination of aqueous cleaners by hazardous substances.

Other Waste and Cost Reduction Considerations

- Air emissions can be reduced from solvent parts cleaners if the lid is kept shut on such units.
- Debris such as rags or towels should be kept out of the cleaning basin. These items add to solvent contamination, system clogging, and air emissions.
- Drain components as much as possible after cleaning to reduce solution drag-out and the premature need for solution replenishment.
- Leasing vs. purchasing. A company should review all equipment, solvents, and services available before choosing the most economical and environmentally sound alternative that will meet its needs.

List of parts cleaner vendors. For assistance with your waste management concerns, call the Office of Waste Reduction at (919) 715-6500.

The Office of Waste Reduction provides free, non-regulatory technical assistance to eliminate, reuse, or recycle wastes before they become pollutants or require disposal.

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