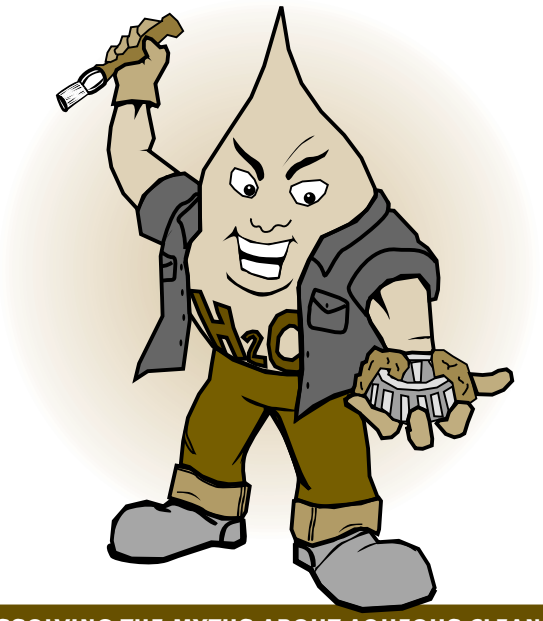
AQUEOUS PARTS CLEANING

Best Environmental Practices for Fleet Maintenance • November 2001



Dissolving the Myths About Aqueous Cleaning

Myth	Fact
❶ Aqueous cleaning units do not clean parts as well as solvent units.	Aqueous spray cabinets and ultrasonic units can clean even difficult-to-clean parts such as wheel bearings.
❷ Aqueous cleaning units cannot clean transmissions or carburetors.	Ultrasonic units *can* effectively clean transmissions and carburetors, including hidden areas.
❸ Part rusting is a problem.	Rust inhibitors in aqueous cleaners decrease the chances of rusting. Rusting can be further minimized by drying parts immediately after cleaning.
❹ Aqueous cleaning is expensive.	Most facilities can save money by 1) implementing aqueous spray cabinets to reduce cleaning labor and 2) maximizing aqueous solution life.
❺ Aqueous cleaning wastes are a hassle to manage.	Waste aqueous solution with sludge typically requires disposal less than three times per year. Skimmed oil can be recycled along with used oil. Spent filters can be disposed of off site or sometimes recycled along with used oil filters.

What's wrong with solvents?

Mineral spirits is a solvent commonly used for part cleaning because of its ability to quickly dissolve oil, grease, dirt, grime, burnt-on carbon, and heavy lubricants. Although it is effective for cleaning, mineral spirits raises significant environmental and human health concerns:

- Mineral spirits contains volatile organic compounds (VOC) that contribute to smog formation and may be toxic when inhaled.
- Mineral spirits evaporates quickly, making worker exposure difficult to control.
- Solvent cleaning units are usually a facility's greatest source of hazardous waste.
- Some areas of the country have already restricted use of solvents in parts cleaning operations.

Using solvents creates unnecessary environmental, worker health, and fire liabilities for your organization. Minimize your costs and regulatory liabilities by switching to aqueous solutions.

What is an aqueous cleaner and how does it work?

Aqueous cleaners are water-based solutions that, unlike petroleum- based solvents, are typically nonflammable and contain little or no VOCs. Instead of dissolving grease and solids, aqueous cleaners rely on heat, agitation, and soap action to break dirt into smaller particles. Although they clean differently, aqueous cleaners perform as well as solvents.

For this fact sheet, aqueous cleaners are defined as water-based cleaners that contain less than 5% (50 grams per liter) of VOCs. Hundreds of aqueous cleaner formulations are commercially available. The California South Coast Air Quality Management District maintains a list of aqueous solutions that are certified to contain less than 5% of VOCs; this list is available on the Internet at www.aqmd.gov/tao/cas/prolist.html. Information presented in this fact sheet is derived from studies of more than 20 aqueous cleaning units in use at over 30 vehicle maintenance facilities in California.

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Types of aqueous cleaning units

The cleaning equipment used is critical to successful aqueous cleaning because it applies two important mechanisms to the cleaning process: mechanical force and heat. Four types of aqueous cleaning units—microbial sink-top, spray, immersion, and ultrasonics—are described below. Each type of unit is designed for specific cleaning applications; therefore, most facilities will likely meet all their cleaning needs by implementing more than one type of unit.

Microbial sink-top units:
Best for quick, light-duty cleaning

Aqueous sink-top units are used for manual cleaning of parts in the same way as conventional solvent sink-top units. Microbes present in the aqueous solution degrade oils and organic contaminants, significantly extending solution life. In addition, microbes are safe and pose no risk to technicians. Non-microbial aqueous sink-top units are also available; these units generally require more frequent solution changes, which may increase operating costs relative to microbial units.

Applications
- Preventive maintenance and light-duty cleaning
- Parts with light to moderate soil buildup
- Small quantities of parts
- Parts for immediate replacement on a vehicle

Key Features
- Solution heated to 110 to 120°F
- Filtering available to remove solids
- Microbes degrade oily contaminants

Advantages
- Low capital cost relative to other aqueous cleaning units
- Little or no waste solution
- Does not dry or chap technician's hands

Disadvantages
- May require more scrubbing effort than solvent
- Difficult to clean heavy or stubborn soils
- Keeping microbes alive requires proper worker training

Unit Selection Considerations
- Make sure the unit is at a comfortable height for your workers
- Greater sink-top size allows larger parts to be cleaned
- Higher pump pressure improves cleaning action
- Workers may react negatively to certain odors

Cost: $1,000 to $1,500

Spray cabinets:
For heavily soiled or large volumes of parts

Aqueous spray cabinets clean parts by spraying high-temperature solution at high pressures within an enclosed cabinet. Spray cabinets are available in a full range of capacities from small to extremely large.

Applications
- Parts with heavy or difficult-to-remove soils
- Moderate to very large quantities of parts
- Medium to large sized parts
- Heavy-duty repairs and rebuilding

Key Features
- Solution heated to 130 to 190°F
- Spray pressures of 40 to 60 pounds per square inch
- Oil skimming options
- Solution concentration typically maintained between 10 and 15%

Advantages
- Significant reduction in cleaning labor
- High level of cleaning performance
- Large cleaning capacities available
- Lower waste management costs compared to solvent units

Disadvantages
- Moderate to high cost

Unit Selection Considerations
- Pump power, spray pressure, flow rate, and number of nozzles (higher spray pressures and greater coverage result in better cleaning performance)
- A 220-volt outlet is often required
- Temperature adjuster helps to optimize cleaning performance
- Insulated units are more energy efficient

Cost: $1,700 to $50,00

Selecting the right type of unit for your facility

Most fleet maintenance facilities require more than one type of aqueous unit to meet their cleaning needs. For example, a facility may maintain walk-up sink-top cleaning stations for clean-and-replace operations, as well as a centrally-located spray cabinet for cleaning heavily soiled or large parts. If the facility services transmissions or carburetors and does not subcontract the cleaning of these parts, the facility may also require an ultrasonic unit. After converting to aqueous cleaning, most facilities have fewer cleaning units because spray cabinets and ultrasonic units typically can handle a large number of parts.

Immersion units:
When soak option is needed

Immersion units consist of a rectangular tank filled with aqueous solution and a removable false bottom. Immersion units give technicians the option of soaking parts in the aqueous solution below the false bottom to loosen soils on the parts or manually scrubbing parts on top of the false bottom, as performed in a sink-top unit.

Applications
- Parts with light to moderate soil buildup
- Small to moderate quantities of parts
- Light- to medium-duty repairs

Key Features
- Allows soaking of parts
- Solution heated to 110 to 120°F
- Filter and oil skimming options
- Solution concentration typically maintained between 25 to 30%

Advantages
- Soaking can improve cleaning and reduce scrubbing time

Disadvantages
- More expensive than sink-top units
- May be difficult to clean heavy or stubborn soils

Unit Selection Considerations
- Make sure unit is at a comfortable height for your workers
- Greater size allows larger parts to be cleaned
- Workers may react negatively to certain odors
- Unit available in stainless steel or plastic construction

Cost: $1,700 to $3,500

Ultrasonic units:
Clean blind areas

Ultrasonic units consist of a steel tank filled with an aqueous solution and are equipped with transducers along the bottom or sides of the tank. The transducers generate high frequency sound waves that produce and intense microscopic scrubbing action on parts surfaces, including blind holes and interior surface areas.

Applications
- Transmissions, carburetors and other hard-to-clean parts
- Parts with blind holes and hidden surface areas
- Heavy-duty repairs and rebuilding

Key Features
- Transducers generate ultrasonic waves
- Solution heated to 140 to 185°F
- Filter and oil skimming options

Advantages
- Very high performance cleaning
- Ability to clean hidden areas on parts
- Significant reductions in cleaning labor

Disadvantages
- Middle to High cost
- Some units make a “hissing” noise

Unit Selection Considerations
- Greater ultrasonics power provides better cleaning ability
- A 220-volt outlet is required for some units
- Greater unit size provides more cleaning capacity

Cost: $3,000 to $12,000

Maximizing aqueous solution life

Aqueous cleaning solutions last longer than solvents. Further extending the life of an aqueous solution will save you money by reducing your chemical purchase and waste disposal costs. To maximize aqueous solution life, you should:

Use microbe technology for sink-top units. Solutions for these units have very long lives and with proper use rarely require disposal.

Filter the solution. Filters, typically cartridge filters, are used to remove solids as small as 50 microns in size.

Perform oil skimming. Oil skimmers remove free-floating oil from the solution, reducing the amount of oil residuals left on parts and significantly extending solution life. Microbial units do not need oil skimming because microbes degrade the oil.

Accept solution discoloration. Many aqueous solutions turn gray or brown during use, but this discoloration does not affect its cleaning ability. Do not change your cleaning solution just because it looks dirty.

Change the solution only when necessary. Change the solution only when its cleaning performance declines. Do not change the solution on a scheduled basis. Always dispose of cleaning solution appropriately.

Maintain solution concentration. Perform chemical additions as needed to maintain the cleaning strength of your solution. Some vendors offer easy-to-use test kits to measure the concentration of your solution and determine when chemical additions are necessary.

Recycle your solution using microfiltration. Some vendors offer an on-site microfiltration recycling service that removes contaminants from the solution, eliminating waste solution generation and disposal.

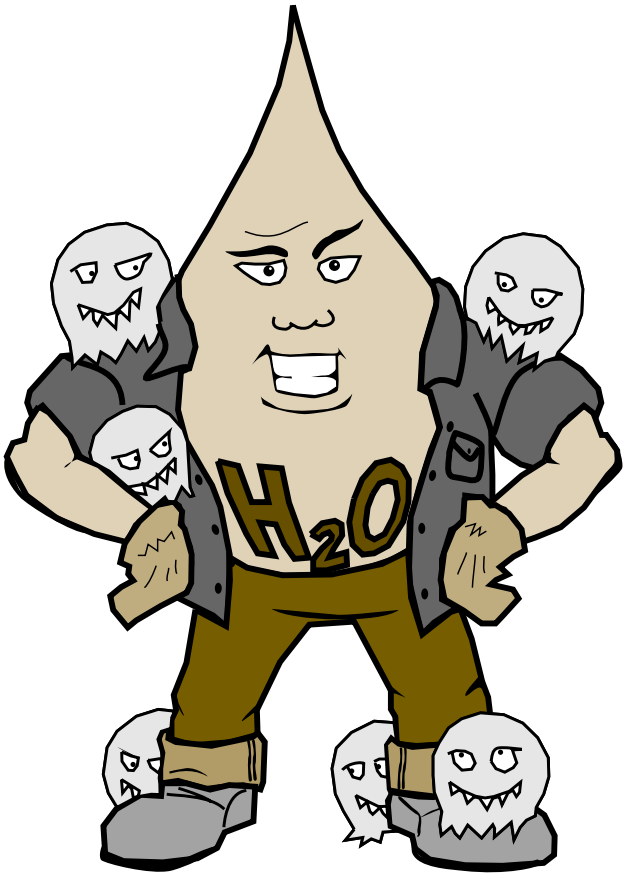
Did You Know?

Your greatest cost for parts cleaning is labor. The time your workers spend cleaning parts is time they could otherwise use for servicing vehicles. Spray cabinets reduce cleaning labor by as much as 75 percent.

convenience

"I can put wheel bearings covered in heavy grease in the spray cabinet, turn on the machine, and go back to work. When I come back and pull out the bearings, they're all clean."

—Mark Foti
MUNI technician, San Francisco, California



Killing your microbes will result in an unpleasant odor, oil accumulation in your solution, or loss of cleaning performance.

Be sure to keep your microbes alive and happy!

Keeping your microbes alive and well

Maintain solution temperature: Don't unplug your microbial sink-top unit, even overnight. Most microbes require a heated environment to survive.

Don't use aerosols above unit: Solvents from aerosols and other sources will harm microbe populations and contaminate the solution.

Allow time for microbes to adjust to new soils: Microbes will adapt to the type of soils you are cleaning. If the microbe solution does not clean effectively at first, cleaning performance will improve after the microbes adapt and digest the new soils.

Don't overload the unit: Do not pour oils or dump soils into the unit. Sudden loading of concentrated oils and grease may harm the microbes. Very heavily soiled parts should be precleaned by wiping with a rag.

Monitor sludge and oil accumulation: Solids will gradually accumulate at the bottom of the solution, decreasing cleaning performance, and therefore may require removal every several years. Also, an oil layer may accumulate on top of some solutions. If the unit does not have aeration, significant oil accumulation may suffocate the microbes and should be skimmed off.

Managing aqueous cleaning wastes

The wastes generated from aqueous cleaning should be managed as described below.

Waste Solution. Aqueous cleaning solutions may qualify as hazardous waste after extended use because concentrations of metals such as cadmium, copper, lead, and zinc may exceed state or federal limits. Therefore, fleet maintenance facilities should always use a licensed waste disposal company to manage waste solution. Many waste disposal companies will analyze the waste solution for you to determine whether it is hazardous. The cost of disposal will vary according to the characteristics of the waste and the volume generated, but will generally be $2 to $4 for a gallon if it is a hazardous waste and $1 to $2 for nonhazardous waste. Unless you obtain permission from your local sewage treatment agency, do not discharge waste solution to the sewer or septic system.

Used Filters. Used filters may be recycled along with spent engine oil filters with the permission of the recycler. Contact your oil recycler to determine if they will take your filters. Some recyclers will only accept used filters if they are encased in metal shells like engine oil filters, and some states prohibit recycling aqueous filters with engine oil filters. If they are not recycled with engine oil filters, used filters should be managed as hazardous waste and disposed of by a licensed waste disposal company. Contact your state environmental agency to learn if any special rules apply to used filters.

Skimmed Oil. Oil skimmed from an aqueous cleaning solution can be managed as used oil and recycled. Most recyclers will accept skimmed oil with used motor oil as long as it is not contaminated with solvent.

Simple sludge management

Little or no sludge will accumulate in aqueous cleaning units with filtration, but units without filtration may accumulate sludge at the bottom. This sludge may be disposed of along with waste solution. Most waste disposal companies will accept a certain percentage of solids in the waste solution. If the sludge is separated from the solution, the sludge may not be disposed of as solid waste unless tested to determine if it is nonhazardous.

Did You Know?

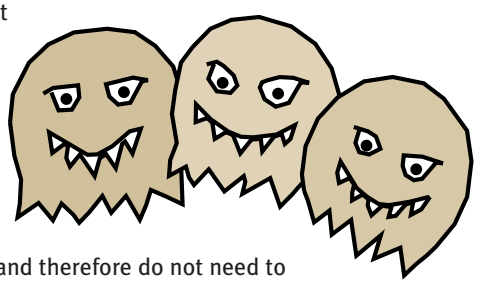
Numerous vendors offer aqueous cleaning equipment. Before purchasing a unit, always:

Obtain and check references **from vendors to learn about unit performance at other facilities and the servicing support provided by the vendors. Cleaning performance and maintenance requirements can vary significantly among different vendors and units.**

Demonstrate aqueous cleaning units **and solution before making a purchase. Most vendors allow facilities to demonstrate units for 30 to 60 days.**

Full service lease agreements

Convenience at a cost. Most fleet maintenance facilities enjoy the hassle-free arrangement of full servicing and waste management provided by a solvent management company. Although some aqueous cleaning vendors offer similar servicing and waste management arrangements, mos do not, usually because it's not necessary. Here's why:



- Aqueous solutions can last significantly longer than solvents and therefore do not need to be changed as frequently. Even with heavy use, a spray cabinet can clean effectively for as long as 6 months between solution changes. With proper use, microbial sink-top units may clean effectively for several years before requiring solution change.
- Servicing aqueous units requires minimal time and effort. Servicing requirements are shown below.

Servicing Requirements	Time to perform and Frequency
Add water and chemical	For 10 minutes, daily to every 2 weeks
Skim oil (not on microbial units)	For 5 minutes, every 2 weeks to every 2 months
Replace filter	For 5 minutes, every 2 weeks to every 2 months
Drain and replace solution	1 hour, every 2 months to every few years

Self servicing aqueous cleaning units may be easier than you think!

Important New Air Board Rules For Automotive Repair Facilities

Regulatory Action	Effective Date
The sale, or distribution in California of any automotive products* (brake cleaners, carb cleaners, engine degreaser, and general purpose degreasers) that at the time of sale or manufacture contains methylene chloride, perchloroethylene, or trichloroethylene is prohibited.	June 30, 2002
The use of any automotive product containing methylene chloride, perchloroethylene, or trichloroethylene by owner or operator of an automotive repair facility is prohibited.	December 31,2002

*(aerosols or bulk products less than 2 gallons)

For additional information on the above Air Toxics Control Measure (ATCM) or additional regional/local air quality requirements for your area, you can search the California Air Resources board website at www.arb.ca.gov/toxics/arm.htm

Case study:
MUNI converts to aqueous cleaning

The City and County of San Francisco Hazardous Waste Management Program is helping Municipal Railway (MUNI) repair and maintenance facilities identify cost-effective alternatives to solvent part cleaners. Between February and December 1998, 14 different aqueous cleaning units were demonstrated at three MUNI fleet maintenance facilities. Based on the demonstrations, the following conclusions were drawn:

- All MUNI facilities can convert entirely to aqueous cleaning without compromising their cleaning performance.
- Facility cleaning requirements are best met by implementing two or more types of aqueous cleaning units.
- Significant cost savings can be realized with aqueous spray cabinets and ultrasonic units because of reduced cleaning labor and larger cleaning capacities. These cost savings can offset unit capital costs and result in short payback periods.
- MUNI can reduce the total number of cleaning units used by implementing spray cabinets and ultrasonic units because these units have large cleaning capacities.

MUNI is considering the following vendors for full implementation of aqueous cleaning:

- Ultrasonic Units:
  - Alpha
  - GlobalSonics
- Spray Cabinets:
  - EMC
  - Landa
  - Safety-Kleen
- Immersion Units:
  - KleenTec
  - Mirachem
- Microbial Sink-Tops:
  - EcoClean
  - ForBest

Electric bus facility

Operations: Light-duty repair, preventive maintenance
Number of Solvent Sink-Top Units: 4
Average Daily Cleaning Labor: 3.7 hours

The electric bus facility used a microbial sink-top unit and a spray cabinet for a 3-month demonstration period.

- The sink-top unit met most of the facility's cleaning needs for small parts.
- The spray cabinet was used to clean large parts.
- Facility workers responded positively to both units.

Electric bus facility conversion to aqueous

From (Solvent Units)		To (Aqueous Units)
2	→	2 microbial sink-top (cost: $1,300 per unit)
2	→	1 spray cabinet (cost: $11,4300 per unit)
Total: 4 solvents	→	**3 aqueous**

Total capital cost: $14,030 Annual savings: $13,250
Payback period: 1.1 years

The estimated cost savings is largely from the reduced labor from the spray cabinet and reduced servicing and waste management costs of the microbial sink-top units.

Diesel bus facility

Operations: Heavy-duty rebuilding and repair
Number of Solvent Sink-Top Units: 13
Average Daily Cleaning Labor: 18 hours

The diesel bus facility demonstrated three spray cabinets, two ultrasonic units, one immersion unit, and four sink-top units.

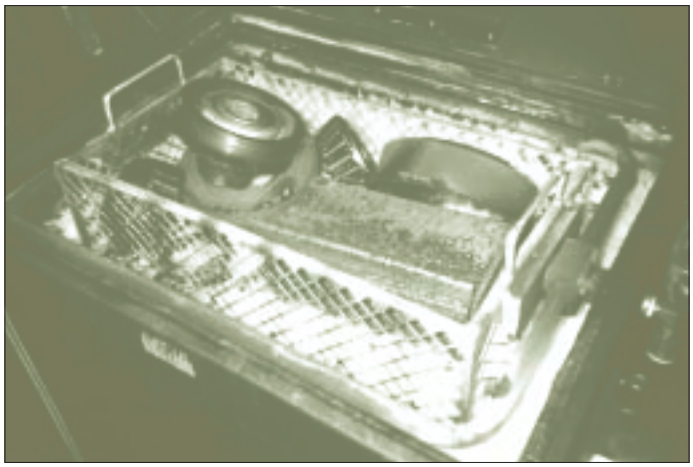
- Facility workers favored the spray cabinets and ultrasonic units because these types of units were able to clean almost all parts, including heavily soiled parts, while significantly reducing cleaning labor.
- One spray cabinet received an extremely positive response because of its 1) exceptional cleaning performance, 2) automatic water fill feature to make up for evaporative losses, and 3) timer that automatically reduces solution temperature overnight and returns it to the optimal level in the morning.
- The ultrasonic units impressed workers with their ability to clean interior surfaces and hidden areas on complex parts, including transmissions. However, some workers objected to a constant hissing noise made by some units.
- The sink-top and immersion units were used for quick, light-duty cleaning of small parts.
- Three of the sink-top units were disliked by facility workers inadequate height and sink-top capacity, and poor cleaning performance.

Diesel bus facility conversion to aqueous

From (Solvent Units)		To (Aqueous Units)
8	⇢	3 spray cabinets (cost: $3,500 per unit)
2	⇢	1 ultrasonic (cost: $12,000 per unit)
2	⇢	3 microbial sink-top (cost: $1,300 per unit)
1	⇢	2 immersion (cost: $3,500 per unit)
Total: 13 solvent	⇢	**9 aqueous**

Total capital cost: $33,400 Annual savings: $134,810
Payback period: 3 months

The estimated cost savings is largely from significant reductions in cleaning labor from the spray cabinets and ultrasonic unit.



less harmful

"I like our microbial sink-top unit because I don't have to breath the heavy solvent vapors and its less aggressive on my skin."

—Daron Gee
MUNI technician, San Francisco, California

Aqueous cleaning cost worksheet for fleet maintenance facilities

Complete this worksheet to calculate the costs of replacing solvent cleaning units with one or more types of aqueous cleaning units. Although many facilities may choose to lease aqueous cleaning units, this worksheet uses purchase prices to calculate a payback period.

The sample calculations provided are for a facility with four solvent units that converts to one microbial sink-top, one spray cabinet and one immersion unit. The microbial sink-top handles 30% of the original workload, the spray cabinet handles 50% and the immersion unit 20%.

The values provided in the sample column serve only as an example, as actual cost and savings will vary according to specific conditions.

Start here by determining your current costs for solvent cleaning.

	SOLVENT CLEANING (leased units with servicing)	your facility	sample
A	Number of solvent units leased		4
B	Current cost per service visit per unit		$90
C	Number of times unit serviced per year		26
D	Total annual solvent service cost (A x B x C)		$9,360
E	Loaded hourly labor rate of shop worker		$50
F	Total number of cleaning labor hours per week		20
G	Total labor cost (E x F x 52)		$52,000
H	**Total annual cost for solvent cleaning (D + G)**		$61,360

If you want to implement one or more microbial sink-top units, continue below. If not, skip to the next section.

	CONVERSION TO AQUEOUS MICROBIAL SINK-TOP CLEANING (units purchased)	your facility	sample
I	Number of microbial sink-top units to be purchased		1
J	Purchase price plus installation costs per unit		$1,400
K	Total capital cost of sink-top units (I x J)		$1,400
L	Cost per gallon of aqueous cleaner		$6
M	Estimated aqueous cleaner use per unit per year in gallons		60
N	Aqueous cleaner purchase cost per unit per year (L x M)		$360
O	Cost per replacement filter		$10
P	Number of replacement filters per unit per year		12
Q	Total cost for replacement filters per unit (O x P)		$120
R	Total number of cleaning labor hours per week		6
S	Total annual labor cost (E x R x 52)		$15,600
T	**Total sink-top unit operation and maintenance (O&M) cost ([N + Q] x I]+S)**		$16,080

If you want to implement one or more aqueous spray cabinets, continue below. If not, skip ahead to the next table.

	CONVERSION TO SPRAY CABINET CLEANING (units purchased)	your facility	example
U	Number of spray cabinets to be purchased		1
V	Purchase price plus installation cost per spray cabinet		$3,500
W	Total capital cost of spray cabinets = U x V		$3,500
X	Cost per gallon of aqueous cleaner		$6
Y	Estimated aqueous cleaner use per unit per year in gallons		240
Z	Aqueous cleaner purchase cost per unit per year = X x Y		$1,440
AA	Disposal cost per gallon of spent solution (including sludge)		$5
BB	Gallons of solution per spray cabinet		65
CC	Number of solution changes per unit per year		6
DD	Total cost for spent solution disposal per unit = AA x BB x CC		$1,950
EE	Number of cleaning labor hours per week (typically reduced up to 80%)		2
FF	Total annual labor cost = E x EE x 52		$5,200
GG	**Total spray cabinet O&M cost = [(Z + DD) x U] + FF**		$8,590

Proceed to side two to calculate costs for converting to immersion, or ultrasonic units, as well as to calculate your potential cost savings. →

Aqueous cleaning cost worksheet for fleet maintenance facilities, continued

If you want to implement one or more immersion or ultrasonic units, continue below. If not, skip to the last table.

	CONVERSION TO IMMERSION/ULTRASONICS (units purchased)	your facility	sample
HH	Number of immersion/ultrasonic units to be purchased		1
II	Purchase price plus installation cost per immersion/ultrasonic unit		$2,200
JJ	Total capital cost of immersion/ultrasonic units (HH x II)		$2,200
KK	Cost per gallon of aqueous cleaner		$6
LL	Estimated aqueous cleaner use per unit per year in gallons		80
MM	Aqueous cleaner purchase cost per unit per year (KK x LL)		$480
NN	Disposal cost per gallon of spent solution (including sludge)		$5
OO	Gallons of solution per immersion/ultrasonic unit		30
PP	Number of solution changes per unit per year		4
QQ	Total cost for spent solution disposal (NN x OO x PP)		$600
RR	Number of cleaning labor hours per week (typically reduced)		4
SS	Total annual labor cost (E x RR x 52)		$10,400
TT	**Total unit O&M cost = ([MM + QQ] x HH] +SS)**		$11,480

Summarize your calculations below to determine your potential cost savings and payback period.

	RESULTS	your facility	sample
UU	Total capital cost of all units purchased (K + W + JJ)		$7,100
VV	Total annual cost savings (including labor costs) (H—T—GG—TT)		$25,210
WW	Payback period (year) (UU/VV)		0.3

Sample parts cleaning cost comparisons

The tables below compare the cost of using an aqueous microbial sink-top unit and a spray cabinet to solvent units. These costs are based on actual demonstration results at two fleet maintenance facilities.

SOLVENT UNIT VS. MICROBIAL SINK-TOP UNIT

One Solvent Unit	Annual costs
Leasing, waste management	$1,908
Electricity (est.)	$120
Cleaning labor (239 hrs)	$11,950
Total costs	**$13,978**

One Microbial Sink-Top Unit	Annual costs
Purchase price (annualized)[1]	$266
Chemicals	$365
Filters	$60
Electricity (estimated)	$360
Solution disposal[2]	$125
Cleaning labor (239 hrs)	$11,950
Total costs	**$13,126**

Annual Savings: $852

[1] Annualized over a 7 year period at 10 percent interest
[2] Assumes off-site disposal of 25 gallons of waste solution once per year

TWO SOLVENT UNITS VS. ONE SPRAY CABINET

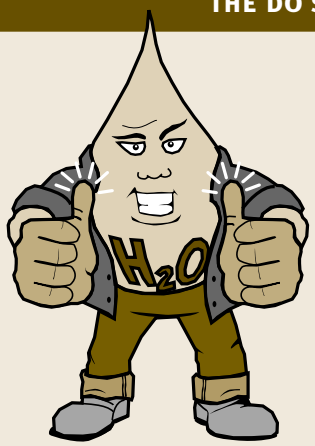
Two Solvent Units	Annual costs
Leasing, waste management	$3,816
Electricity (estimated)	$369
Cleaning labor (738 hrs)	$36,900
Total costs	**$41,085**

One Spray Cabinet	Annual costs
Purchase price (annualized)[1]	$776
Chemicals	$510
Solution and sludge disposal[2]	$3,672
Electricity (estimated)	$3,100
Cleaning labor (221 hrs)	$11,050
Total costs	**$19,108**

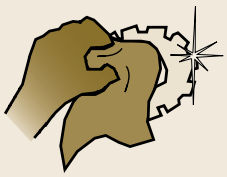
Annual Savings: $21,977

[1] Annualized over a 7 year period at 10 percent interest
[2] Assumes off-site disposal of 64 gallons of waste solution 6 times per year

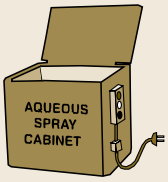
THE DO'S AND DON'TS OF AQUEOUS CLEANING



Do

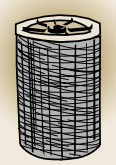


Dry parts immediately after cleaning to prevent rusting

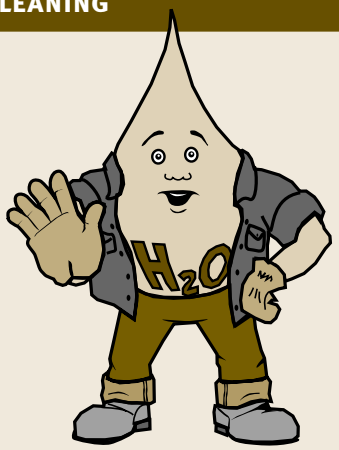


Demonstrate units before purchasing

Use oil skimming to extend solution life



Use filtration to extend solution life



Don't

Don't discharge waste solution into sewers

Don't contaminate aqueous solution with aerosol solvents

Don't use solutions with greater than 5% VOCs

Your state or local government environmental agencies have additional information about compliance and pollution prevention opportunities for auto repair shops and fleet maintenance operations in your state or area. For information on California regulatory compliance issues contact your nearest Department of Toxic Substances Control (DTSC) Regional Office by calling 1-800-728-6942. You may also access the CAL EPA website at www.calepa.ca.gov for links to California Regulatory Agencies. To obtain additional copies "The Pollution Prevention Tool Kit, Best Environmental Practices for Auto Repair" (Document number 626) or "The Pollution Prevention Tool Kit, Best Environmental Practices for Fleet Maintenance" (Document 625) contact "DTSC's Office of Pollution Prevention and Technology Development (OPPTD)" at 1-800-700-5854. Accompanying videos, "Profit Through Prevention"are available at the same phone number for either auto repair (Document number 1504) or fleet maintenance (Document number 1504). DTSC's OPPTD also provides technical assistance and pollution prevention resources to businesses and government agencies. Electronic versions of the fact sheets can be found at: www.dtsc.ca.gov/PollutionPrevention/Vehicle_Service_Repair.html

*Second reprint by DTSC, November 2001.