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## Aqueous parts washer for small operations

Manually operated parts washers are commonly used in maintenance operations. Aqueous parts washers use waterbased chemistries and can be less hazardous to operate than petroleum solvent parts washers. Aqueous cleaners eliminate the slight fire risk of petroleum solvents, like mineral spirits. Additionally, they can provide a better work environment by reducing the volatile organic compound (VOC) emissions and their associated odors and are less likely to cause skin problems such as dermatitis. Aqueous parts washers, if chosen carefully and operated sensibly, can improve parts cleaning in your maintenance operation and may reduce hazardous waste generated.

### Aqueous Cleaners

Most aqueous cleaners remove oils as fast as mineral spirits can. Solvents used for degreasing work by diluting oils so only a thin layer of oil remains on part surfaces. As the solvent becomes saturated with oil, the oil on parts will not dissolve adequately, leaving an objectionable film. Aqueous cleaners leave an oil-free surface until the cleaner is close to failure. Without a petroleum film remaining on parts, rust may be a problem; so aqueous cleaners may need to include a rust inhibitor. Because aqueous cleaners generally perform better with increased temperature, aqueous parts washers are almost always heated.

Emulsifying cleaners break oils into very fine droplets and disperse them throughout the cleaner. These cleaners are very effective when new but tend to have short lives.

Oil splitting cleaners displace oils from part surfaces but allow the oil droplets to combine and float to the surface of the cleaner. These cleaners can have very long and effective lives, but the system needs to prevent floating oils from re-contaminating parts. Sink-on-drum washers work well in this regard.

Microbes are used in some cleaner formulas to digest petroleum contaminants. Microbe and nutrient packages are added to the cleaner and

circulated throughout the bath. The microbes break down the petroleum hydrocarbons and reproduce themselves in the nutrient-rich environment. This process works as long as bath conditions support the microbe colony. To successfully use microbes, maintain proper solution temperature, avoid chlorinated solvent aerosol use at the parts washer and adjust microbe concentration as needed. These cleaners work best when the work load is relatively steady; long periods of inactivity can starve the microbes. Properly maintained, the end result is petroleum contaminants converted to water and carbon dioxide, without odors or degradation problems.

Aqueous solvents are water-soluble solvents, commonly terpenes that are mixed with surfactants to remain dispersed in water. They tend to be very good cleaners, particularly for removing grease. They work like emulsifying cleaners and generally have relatively short lives. It can be difficult to identify this type of cleaner; a measurable flash point (<200°F) or significant VOC content would be indicators of aqueous solvents. Many sewer systems can accept this type of aqueous waste, depending on their waste load and design.

### Disposal

Aqueous cleaners for manual parts washing almost always have nonhazardous formulas. Determine whether the formula is nonhazardous by reviewing the MSDS and talking to the supplier. The following indicate if a cleaner is likely nonhazardous: flash point above 140°F; pH between 2 and 12.5; and no hazardous ingredients or only those with high Occupational Safety Health and Administration (OSHA) permissible exposure levels (PELs) or Hazardous Materials Information Systems (HMIS) hazard ratings less than two.

Aqueous cleaners can pick up contaminants that turn used cleaners into hazardous waste. Oils, fluids, surface dirt and debris removed from parts may make the used cleaner hazardous. Cleaners can also pick up heavy metal contaminants, such

as barium, cadmium, chrome and lead from the parts cleaned. Using carburetor cleaner, gasoline, kerosene or paint thinner near the parts washer, or on the parts going into the parts washer, can make the used cleaner hazardous. If the cleaner does not need disposal, as in the case of long-life cleaners, contamination does not matter as long as the level of contaminants remains low enough to allow proper operation of the cleaner.

A number of aqueous parts cleaning solutions are designed to operate indefinitely. Chemical additions are needed to make up for losses carried out on parts or from evaporation. While the solution does not require routine disposal, its waste includes used oil, and either sludge or filter waste.

The Minnesota Pollution Control Agency fact sheet *Managing Aqueous Parts Washers* #4.44 reviews how to assess and manage aqueous parts washer waste including oil, filters, sorbents and sludge.

### Aqueous Equipment

Aqueous parts washers designed to remove or isolate oils, sludges and solids maximize the cleaning solution's life and effectiveness. Manufacturers have different designs and procedures for doing this. Oil separation features can include oil weirs, skimming devices, oil absorbents, and microbe or enzyme-based systems. Removed oils can be combined with existing waste oil streams for disposal.

Filtration is a common feature that removes particulate matter which would cause circulation pump wear, interfere with the

solution heater and degrade the cleaner. Add filtration to your current small parts washer by installing an automotive filter relocation kit. The Iowa Waste Reduction Center has illustrated step-by-step instructions at <[www.iwrc.org/downloads/pdf/partswasher1x1.pdf](http://www.iwrc.org/downloads/pdf/partswasher1x1.pdf)>.

Look for sink designs that have easy to reach drain sumps, drain trays, oil skimmers and filtration features. These help make equipment maintenance easier, allowing more time for part cleaning.

Other washer features are useful for certain applications. With immersion units, parts soak in a reservoir to aid in cleaning and reduce scrubbing time. Immersion chambers can use mechanical agitation to help with harder to remove soils. Ultrasonic cleaning systems use a soak chamber with transducers mounted on the sides and/or bottom. They produce high frequency sound waves that cause intense microscopic scrubbing of part surfaces, reaching blind holes and interior surface areas. This technology works well for complex parts needing precision cleaning without significant additional labor.

### Cabinet Washers

Manual aqueous parts washing can be replaced with a cabinet-style aqueous parts washer when large parts or large quantities of heavily soiled parts require cleaning. Solutions are heated to higher temperatures and pressurized spray nozzles impact all the part surfaces. Cleaning labor can be significantly reduced because parts can be loaded into the cabinet, the wash cycle set on a timer and left until done.

### Aqueous Parts Washer Equipment and Cleaning Product Supplies

MnTAP maintains the following list solely as a service to Minnesota companies. This is not a complete list of suppliers and does not represent an endorsement by MnTAP. MnTAP, by providing this list, does not represent that the products and services do or do not ensure compliance with environmental and safety laws in any specific application.

Company	Equipment	Cleaners
ADF Systems Ltd. Humboldt, IA 800.959.1191 <a href="http://www.adfsystems.com">www.adfsystems.com</a>	Cabinet washers Manual parts washers	Available
Alkota Cleaning Systems Inc. Alcester, SD 800.255.6823 <a href="http://www.alkota.com">www.alkota.com</a>	Cabinet washers	
ATEC San Antonio, TX 800.531.5978 <a href="http://www.atec-trans-tool.com">www.atec-trans-tool.com</a>	Cabinet washers Internal and external filtration	Microbial cleaning solution
Better Engineering Baltimore, MD 800.229.3380 <a href="http://www.betterengineering.com">www.betterengineering.com</a>	Cabinet washers	Available
BioForce Services Milwaukee, WI 414.350.4823 <a href="http://www.bioforceusainc.com">www.bioforceusainc.com</a>	Manual parts washers Immersion washers	Available

Company	Equipment	Cleaners
Branson Ultrasonics Danbury, CT 203.796.0400 www.bransoncleaning.com	Ultrasonic cleaning systems	Available
Build-All Corporation Milwaukee, WI 800.558.2148 www.build-all.com	Manual parts washers Immersion washers Cabinet washers	
Seacole Delano, MN 800.966.2909 www.seacole.com		Long-lived, oil splitting cleaner, demonstrated performance in manual parts washers
ChemFree Corp Norcross, GA 800.521.7182 www.chemfree.com	Cabinet washers Manual parts washers	Microbial or bio-cleaners
Clarus Technologies LLC Bellingham, WA 800.671.1514 www.clarustechnologies.com	Manual parts washers	
Crest Ultrasonics Corporation Trenton, NJ 800.992.7378 www.crest-ultrasonics.com	Ultrasonic cleaning systems, multiple stages and table-top models Ultrasonic tanks and transducers	Available
Equipment Manufacturing Corporation Santa Fe Springs, CA 888.833.9000 www.equipmentmanufacturing.com	Cabinet washers	
Fountain Industries Company Albert Lea, MN 800.328.3594 ext 145 www.fountainindustries.com	Cabinet washers Manual parts washers Immersion parts washers Ultrasonic tanks	
Graymills Corp Chicago, IL 773.248.6825 www.graymills.com	Cabinet washers Manual parts washers Ultrasonic and immersion washers	Various, including bioremediation cleaners
Hotsu Equipment of Minnesota Fridley, MN 800.229.4779 www.hotsuminnesota.com	Cabinet washers Immersion parts washers	Available
JRI Industries Springfield, MO 417.866.8855 www.jriindustries.com	Cabinet washers Agitation and immersion models	Available
Kärcher Cuda Series Cleaning Systems Camas, WA 888.319.0882 www.karcherpartswashers.com	Cabinet washers Manual parts washers	Available
KleenTec Albert Lea, MN 800.521.2740 www.kleentec.com	Cabinet washers Immersion and table top washers Manual parts washers	Various, including bioremediation cleaners

Company	Equipment	Cleaners
Landa American Pressure Robbinsdale, MN 800.544.0836 www.landa.com	Cabinet washers	Available
Mart Corporation Maryland Heights, MO 314.447.0136 www.martwash.com	Cabinet washers	Available
MiraChem Phoenix, AZ 800.847.3527 www.mirachem.com	Cabinet washers Manual parts washers Immersion parts washers	Available
Precision Metal Works Maquoketa, IA 52060 800.272.5438 www.pmwequipment.com	Cabinet washers	
Ramco Specialty Products Huntington Beach, CA 800.334.7071 www.ramcospec.com		Microbial, including bioremediation cleaners
Ransohoff Cincinnati, OH 800.248.9274 www.ransohoff.com	Agitating ultrasonics Cabinet washers Ultrasonic tanks Immersion parts washers	Various, including oil splitting
Roto-Jet of America Santa Clarita, CA 661.299.2231	Cabinet washers Immersion parts washers	Available
Renegade Parts Washers & Detergents Reedsburg, WI 800.774.7900 www.renegadepartswashers.com	Cabinet washers Immersion washers Manual parts washers	Available
Stoelting Kiel, WI 800.558.5807 www.stoeltine.com	Cabinet washers Ultrasonic tanks	
Trimac Industries Bonner Springs, KS 800.830.5112	Cabinet washers	
Zep Manufacturing Company Atlanta, GA 877.428.9937 www.zep.com	Cabinet washers Manual parts washers	Available
Zymo Duluth, GA 770.232.5304, ext. 234 www.zymo.com	Agitation and immersion parts washers Manual, bioremediated parts washers	Microbial, bioremediated cleaners



## For More Information

MnTAP has a variety of technical assistance services available to help Minnesota businesses implement industry-tailored solutions that maximize resource efficiency, prevent pollution, increase energy efficiency, and reduce costs. Our information resources are available online at <[mnap.umn.edu](http://mnap.umn.edu)>. Please call MnTAP at 612.624.1300 or 800.247.0015 for personal assistance or more information about MnTAP's services.