
A GUIDE TO LABWARE WASHER CLEANING





Better, Safer Science Through Proper Detergent Selection and Cleaning

The principal concern for any scientist or technician working in the laboratory is that glassware, instruments, and equipment be free of interfering residues. These often unseen residues can cause invalid analytical results. For example, they can erroneously accelerate or decelerate rate dependent experiment by causing localized high concentration of reactants inside micelles. They can inhibit culture growth, cross-contaminate batches, and cause nonreproducible results.

To solve these problems, labware must be cleaned thoroughly and any interfering residues removed. This requires that an appropriate laboratory detergent be selected and an effective cleaning method used.

General Directions

Machine Washing — is used in laboratories for cleaning large quantities of reusable labware. Selection and use of the correct detergent, good maintenance practices, and proper usage and loading of your washing machine will help you have reliably clean glassware and equipment.

Machine Maintenance Tips

Acid Rinsing — is a periodic (monthly or quarterly) empty acid wash cycle to remove scale build-up that can clog nozzles and deposit white calcium scale.

Sometimes insoluble metal hydroxides form, amphoteric proteins deposit, and certain alkaline insoluble residues, such as certain polymers, fail to be removed during alkaline cleaning. To remove these residues, an acid rinse step is required.

Rinse Aids — are not recommended for laboratory glassware washing. The Jet Dry™ type of rinse aid deposits on the glassware hydrophobically and repels the water off the glassware during drying to avoid water evaporating and forming water spots. Many rinse aids are cationic positively charged compounds that are attracted to surfaces that repel the water. This can leave a surface with the water repelling rinse aid. In laboratory labware washing, it is better to use multiple deionized water rinsing and good loading procedures to avoid trapping and carrying over wash water with residue load to avoid water spots. Note: if tap water is only available, it may be better to have the washer set to air dry and open the washer immediately after the first rinse. Then manually rinse in deionized water before proceeding to an air dry or even just a heated drying cycle.

Machine Validation

The GMP regulations include several specifications (Part 133.4, 1963, and Part 211.67, 1978) that provide guidelines for GMP washer/dryer design and construction. Unfortunately, these regulations leave many areas open for interpretation. With no clear

standard, a great many “lab style” washers have been developed—their limitations, not evident until long after purchase and installation.

A documentation package is needed to complete the validation and qualify the cleaning system. The package should contain (as a minimum) the following components:

- User’s manual
- Maintenance manual
- Instrument list
- Electrical diagram
- Piping and instrumentation diagram
- Spare parts list
- Exploded view
- Welding report and welder certificate
- Source codes (in the form of a written copy, a floppy disc, and a spare E-prom)
- Passivation report
- As-built drawings
- IQ/OQ documentation

How to Dose Detergents

Powder: If there is a cup or receptacle built in to the washer, fill the receptacle according to the machine manufacturer’s directions. Many under-counter washers can use powders. If no receptacle is available, you can still dose a correct amount of powder into the bottom of a washer prior to washing as long as you skip the pre-wash cycle or add the powder after the pre-wash cycle finishes. Calculate the correct amount of powder by consulting the owners manual and seeing how much water is used in the wash cycle. A typical under counter washer will use about 2 gallons (about 8 liters). A medium size washer might use around 4 gallons (16 liters), and a large floor standing washer might use as much as 10 gallons (38 liters). Use 0.5 - 1.25 oz. of powder per gallon or 5 - 10 grams.

Liquids: Follow machine manufacturers directions. Not intended for powder detergent receptacles. If available, use liquid detergent reservoir, connecting tubes or metering pump. In general, use 1/2 - 1% solution in hot water wash cycle (1 1/4 - 2 1/2 Tbsp. per gallon, 3/4 - 1 1/4 oz. per gallon or 5 - 10 ml per liter — most machines need 2 1/2 oz. added at a typical 2 gallon wash cycle). For difficult soils, raise water temperature and use more detergent. Wear protective gloves and eyewear when handling. RINSE THOROUGHLY. For critical cleaning, do final or all rinsing in distilled, deionized or purified water. For food contact surfaces, rinse with potable water. Calculate the correct amount of liquid to use by consulting the owners manual and seeing how much water is used in the wash cycle. A typical under counter washer will use about 2 gallons of water (about 8 liters) and 1.0 - 2.5 oz. of liquid detergent.

Problem Glassware

Graduated cylinders need to be loaded at an angle so that the base does not trap a large amount of “dirty” washwater and contaminate the rinse. If there is no option to tilt the cylinders to promote drainage, then extra rinse may allow sufficient exchange of water by stopping at the end of the wash cycle. Manually dumping out the tops of the cylinders can help also.

Pipets require special flow thru fittings and racks to clean in a washer. Obtain a special pipet rack from the machine manufacturer.

How to Select the Appropriate Lab Washer Detergent

- Use the Detergent Selection Guide below to help identify the Alconox cleaner for your type of Lab Washer Machine.
- Be sure to include in your decision-making process the requirements of College of American Pathology for Residue Detection Method and State and NLAC for Certificates of Analysis and Inhibitory Residue test reports.
- If your industry involves validating your residue detection method, all of the Alconox products listed below have methods for detection.

DETERGENT SELECTION GUIDE

Types of cleaner used in different types of labs Lab Alconox Brand ->	Phosphate Free Cleaners			General Purpose Cleaners			Trace metal
	Machine			Machine			Machine
	TERGAJET	SOLUJET	CITRAJET	ALCOJET	DETOJET	CITRAJET	CITRAJET
	Alkaline	Alkaline	Acid/Rinse	Alkaline	Alkaline	Acid/Rinse	Liquid
	Powder	Liquid	Liquid	Powder	Liquid	Liquid	Acid
Environmental trace analysis (2)	●	●	●				
Microbiology	●	●	●				
Wastewater (2)	●	●	●				
Water and Drinking Water (2)	●	●	●				
Biochemistry/Biology				■	■	■	▲
Chemistry, Analytical				■	■	■	▲
Food				■	■	■	▲
Forensics				■	■	■	▲
Genetics				■	■	■	▲
Hospital/Medical Laboratory				■	■	■	▲
Materials Testing				■	■	■	▲
Microbiology				■	■	■	▲
Nuclear (radioisotopes)				■	■	■	▲
Pathology(1)				■	■	■	▲
Petrochemicals				■	■	■	▲
Pharmaceuticals				■	■	■	▲
Pharmacology				■	■	■	▲
QA/QC				■	■	■	▲
Toxicology				■	■	■	▲

(1) Requires College of American Pathology (CAP) Questionnaire Residue Detection method from www.alconox.com

(2) Requires Inhibitory Residue Test data to comply with State and NLAC standards from COA and Inhibitory Residue test at www.alconox.com

Application Key Concerns	What Are You Cleaning?	Recommended Powder Detergent	Recommended Liquid Detergent
Healthcare/Veterinary – Effective preparation for sterilization, longer instrument life.	Surgical, anaesthetic and examining instruments.	ALCOJET	DETOJET
Pharmaceutical/Medical Device/Biotechnology – Passing cleaning validation for FDA good manufacturing practices. For stainless steel, glass, plastic, elastomer cleaning.	Titanium dioxide, petrolatum, oils, ointments, carbopols, lacquer, zinc oxides, proteins, steroids, and Eudragit*polymers, coatings, amines.	ALCOJET	SOLUJET
	Inorganic residues, salts, metallics, pigments, Eudragit*polymers, amphoteric, coating amines, ethers, starches.		CITRAJET
Laboratory/Environmental – Reproducible results, no interfering residues, Keep laboratory accreditation. Lab safety.	Glass, metal, plastic labware, ceramics, tissue culture, porcelain.	ALCOJET or TERGAJET – phosphate free	DETOJET SOLUJET phosphate free
Metalworking, Precision Manufacturing, and Optics – Clean parts, avoid volatile solvents, strong acids and other hazardous chemicals.	Delicate substrates.		LUMINOX
Electronics – Avoid conductive residues, avoid CFC, pass cleaning criteria.	Circuit boards, conductive residues, fluxes.		DETERGENT 8

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1. [Click here](#) and complete sample request form and check "please send book"
2. Complete questionnaire (next page) and fax to 914-948-4088, scan and email to cleaning@alconox.com, or mail to Alconox, Inc. 30 Glenn St, White Plains, NY 10603 USA
3. or, call 877-877-2526 to order!



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Please Cut Here

1. **YES!** Please send me my copy of *The Aqueous Cleaning Handbook* and detergent sample for my laboratory glassware washing machine
 Just send me detergent samples without book

2. **What surfaces are you cleaning?**

<input type="checkbox"/> 1. Glass, ceramics, porcelain	<input type="checkbox"/> 5. Aluminum
<input type="checkbox"/> 2. Stainless Steel	<input type="checkbox"/> 6. Pipets
<input type="checkbox"/> 3. Teflon, PTFE	<input type="checkbox"/> 7. Other _____
<input type="checkbox"/> 4. Nylon	_____

3. **What soils are you removing?**
 - 1. Proteinaceous soils, blood and other body fluids, tissue
 - 2. Scale, salts, metal oxides, trace metals
 - 3. Silicone oils, mold-release agents, buffing
 - 4. Oils, cutting fluids, chemicals, solvents, bio-residues, particulates, laboratory soils
 - 5. Heavy oils, greases, baked-on residues
 - 6. Conductive residues, rosins, solder fluxes, particles particulates
 - 7. Other (Please describe) _____

4. **What type of Labware Washing Machine ?**

Does it take powder? Yes No

Does it take Liquid? Yes No

Is it a new machine? Yes No

Age of machine _____

Brand Labconco Miele Steris Lancer
 Other _____

Size Under counter Medium Floor Standing Large Floor Standing

Does it have an Acid Rinse Cycle? Yes No

5. **a. What detergent are you currently using?**
 Miele Lancer Steris Decon Other _____
- b. Do you require Phosphate free detergent?** Yes No

6. **Type of Lab**

<input type="checkbox"/> Environmental trace analysis (2)	<input type="checkbox"/> Materials Testing
<input type="checkbox"/> Microbiology	<input type="checkbox"/> Microbiology
<input type="checkbox"/> Wastewater (2)	<input type="checkbox"/> Nuclear (radioisotopes)
<input type="checkbox"/> Water and Drinking Water (2)	<input type="checkbox"/> Pathology(1)
<input type="checkbox"/> Biochemistry/Biology	<input type="checkbox"/> Petrochemicals
<input type="checkbox"/> Chemistry, Analytical	<input type="checkbox"/> Pharmaceuticals
<input type="checkbox"/> Food	<input type="checkbox"/> Pharmacology
<input type="checkbox"/> Forensics	<input type="checkbox"/> QA/QC
<input type="checkbox"/> Genetics	<input type="checkbox"/> Toxicology
<input type="checkbox"/> Hospital/Medical Laboratory	

7. **What size/how often do you purchase cleaners?**
 1. ___ units (single boxes or bottles)
 weekly monthly yearly
 2. ___ cases
 weekly monthly yearly
 3. ___ med. Sizes (50 -100 lb or 5-15 gal drum)
 weekly monthly yearly
 4. ___ bulk sizes (300 lb or 55 gal drum)
 weekly monthly yearly

8. **Estimated annual purchases of high-quality cleaners in US\$** _____

9. **Do you measure cleanliness (beyond visual inspection)?**
 Yes No
 If yes, how do you measure it? _____

10. **Any special waste treatment/disposal concerns?** _____

11. **Your company's principal activity:**

<input type="checkbox"/> Municipal Water Lab	<input type="checkbox"/> Electronics
<input type="checkbox"/> Healthcare	<input type="checkbox"/> Cosmetics
<input type="checkbox"/> Veterinary	<input type="checkbox"/> Nuclear
<input type="checkbox"/> Pharmaceutical	<input type="checkbox"/> Food & Dairy
<input type="checkbox"/> Biotechnology	<input type="checkbox"/> Optical
<input type="checkbox"/> Medical Device Mfg.	<input type="checkbox"/> Educational Inst.
<input type="checkbox"/> Metalworking	<input type="checkbox"/> Laboratory
<input type="checkbox"/> Precision Mfg. (describe _____)	
<input type="checkbox"/> Other _____	

12. **Your primary job function: (choose one)**

<input type="checkbox"/> Administrative Assistant	<input type="checkbox"/> Purchasing
<input type="checkbox"/> Consultant	<input type="checkbox"/> QC/QA Validation
<input type="checkbox"/> Corporate Management	<input type="checkbox"/> Safety/Regulatory Compliance
<input type="checkbox"/> Engineer	<input type="checkbox"/> Sales/Marketing/Distribution
<input type="checkbox"/> Healthcare	<input type="checkbox"/> Scientist/Researcher/Teacher
<input type="checkbox"/> Laboratory Manager	<input type="checkbox"/> Stockroom/Store/Warehouse
<input type="checkbox"/> Plant Manager	<input type="checkbox"/> Technician
<input type="checkbox"/> Other _____	

13. **I am asking for samples because of (check all that apply)**

<input type="checkbox"/> A need for better performance	<input type="checkbox"/> A new cleaning application
<input type="checkbox"/> A need for more environmental cleaner	<input type="checkbox"/> New cleaning equipment
<input type="checkbox"/> A need for a safer cleaner	<input type="checkbox"/> Other _____
<input type="checkbox"/> Recommendation	

Please print name and address correction below

NAME _____

TITLE _____

EMAIL _____ PHONE _____

COMPANY NAME _____

STREET _____

CITY _____ STATE _____ ZIP _____ COUNTRY _____

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