

CRITICAL CLEANING GUIDE

How to select and use detergents for critical cleaning applications





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Solving critical cleaning problems for more than 65 years

This guide gives you the benefit of our more than half-century of experience—including a method-by-method review of critical cleaning procedures, and a selection matrix to identify the right Alconox, Inc. detergent for your application.

Get started with Alconox:

- **Free Samples:** Receive free samples of Alconox, Inc. detergents and/or *The Aqueous Cleaning Handbook*.
- **Purchase:** Alconox, Inc. detergents are available from leading healthcare, laboratory and industrial suppliers. See our website for U.S. and international distributors.
- **Support:** Call our Technical Service Department for consultation on your cleaning problems.
- **Online Information:** Technical bulletins and Material Safety Data Sheets. Certificates of analysis. Cleaning validation references. Inhibitory residue test and lab accreditation (CAP/NELAP) info. Chinese, French, German, and Spanish language support.

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ALCONOX®, ALCOJET®, ALCOTABS®, CITRAJET®, CITRANOX®, DETERGENT 8®, DETOJET®, LUMINOX®, LIQUINOX®, SOLUJET®, TERGAZYME®, and TERGAJET® are registered trademarks of Alconox, Inc. ©2014 Alconox, Inc.

PHARMACEUTICAL & BIOTECHNOLOGY

Handle tough critical cleaning jobs, from tablet presses to mixing tanks

If you have pharmaceutical or biotechnology production machinery that must be clean and free of interfering residues, Alconox, Inc. has an acidic, neutral or alkaline biodegradable detergent for the job, including meeting applicable disposal requirements. Whether your process is manual, immersion or circulate CIP, almost any glass, plastic, metal, rubber or porcelain surface can be safely, effectively and economically cleaned with an Alconox, Inc. detergent.

Alconox, Inc. detergents are available worldwide with consistent formulations, certificates of analysis, ingredient toxicity data, shelf life information, residue sampling techniques, ingredients disclosure, analytical methods, lot number tracking, and validation support. Customer support also can include cooperation with audits and vendor questionnaires.

Clean all processing surfaces, difficult residues and types of processing equipment

Manual, Soak, Ultrasonic, Soak CIP

Equipment to Clean	Contaminants	Recommended Detergent
Capsule Fillers Centrifuges Comminutors Compactors Conveyors Dryers Filling lines Filters	Acid-Labile Compounds Amines Bicarbonates Alkaloids Metal Complexes Amphoteric Metal Oxides or Hydroxides Proteins Starches Eudragit* (E/RL/RS/E100) Carbonates Coatings	CITRANOX
	Emulsified or Base-Labile Compounds Oils Organic Acids Fats Acid Salts Greases Steroids Alcohols N-heterocyclics Amino Acids Eudragit* (E/RL/RS/100) Some Proteins Coatings Polyols Titanium Dioxide Phosphates Petrolatum	ALCONOX Powder LIQUINOX Liquid
	Protease Labile Compounds Proteins Biowastes Biofilms Fermentation Residues	TERGAZYME

Machine Washer, Spray Clean in Place (and combined manual)

Equipment to Clean	Contaminants	Recommended Detergent
Capsule fillers Centrifuges Comminutors Compactors Conveyors Dryers Filling lines Filters	Acid-Labile Compounds Amines Bicarbonates Alkaloids Metal Complexes Amphoteric Metal Oxides or Hydroxides Proteins Starches Eudragit* (E/RL/RS/E100) Carbonates Coatings	CITRAJET
	Base-Labile Compounds Oils Titanium Dioxide Fats Petrolatum Greases Some Proteins Alcohols Amino Acids Eudragit* (E/RL/RS/100) Coatings Phosphates Organic Acids Acid Salts	ALCOJET Powder SOLUJET Liquid



Before:

Some pharmaceutical ingredients resist going into solution, making tablet presses tough to clean.



After:

Punches and dies cleaned with CITRANOX meet stringent pharmaceutical cleaning validation standards.

Troubleshooting and Validation Services

Contact Alconox, Inc. for critical cleaning, residue-interference troubleshooting, and cleaning-validation assistance services.

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Before:

Medical devices such as the prosthetic hip joint shown here must be critically pre-cleaned prior to coating and packaging.



After:

Swab tests validate successful cleaning with ALCONOX-brand detergents.

MEDICAL DEVICE MANUFACTURING

Effectively clean medical equipment to critical regulated standards

Manufactured medical devices for human or veterinary health often must be cleaned to implantable standards during manufacturing. Alconox, Inc. cleaners are expressly formulated to get these products critically clean without leaving interfering residues, whether the product is for biomechanical or electronic use.



ALCONOX cleaners for medical equipment manufacturing applications

Manual/Ultrasonic or Spray Cleaning

Equipment to Clean	Contaminants	Process	Recommended Detergent
Stainless Steel Cobalt Chrome Titanium Aluminum Composites Most plastics	Dye Penetrants Coolants Buffing Rouge Compounds Tapping Oils Contaminating Residues	Manual/ Ultrasonic	ALCONOX Powder
		Pressure/ Spray	LIQUINOX Liquid
		Low Foam	SOLUJET

Special-Case Plastics

Equipment to Clean	Contaminants	Process	Recommended Detergent
Acrylic Polycarbonate Other Plastics Subject to Stress Cracking	Coolants Particulates Oils Fingerprints	All Cleaning Processes	DETOJET

Manual/Ultrasonic or Spray Cleaning

Equipment to Clean	Contaminants	Process	Recommended Detergent
Aluminum Brass Copper	Die Penetrants Coolants Buffing Rouge Compounds Tapping Oils Contaminating Residues	Manual/ Ultrasonic	CITRANOX
		Pressure/ Spray	CITRAJET
		Low Foam	CITRAJET



Before:
Blood dried onto scalpel handles is difficult to thoroughly remove.



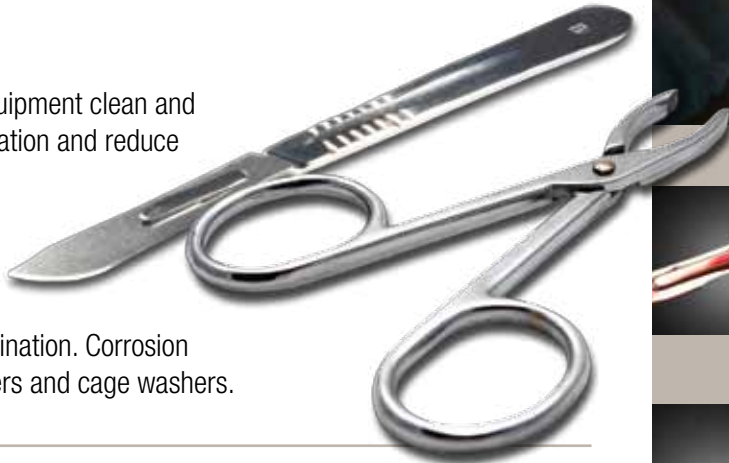
After:
Soaking in TERGAZYME, followed by gentle cleaning, prepares surgical instruments for effective sterilization and prolongs instrument life.

HEALTHCARE, VETERINARY & MEDICAL DEVICE REPROCESSING

Meet the most demanding criteria for effective cleaning of reusable instruments and equipment prior to sterilization

Healthcare cleaning procedures are intended to keep instruments and equipment clean and ready for sterilization, prolong their working life, minimize cross-contamination and reduce medical waste.

When proteinaceous soils such as blood or mucus must be removed, adding an enzyme to the detergent formula allows instruments to clean via soaking and gentle cleaning, rather than by abrasive scrubbing. This prolongs their working life and decreases the chance of microbial contamination. Corrosion inhibited detergents give effective low-foam cleaning in automated washers and cage washers.



The right cleaner for every medical device reprocessing application

Manual, Ultrasonic, Soak

Equipment to Clean	Contaminants	Process	Recommended Detergent
Reprocessed Medical Devices Surgical and Examining Equipment Endoscopes Dental Equipment	Biological/ Proteinaceous Soils	Manual, Ultrasonic, Soak	ALCONOX Powder
		Enzymatic Soak	LIQUINOX Liquid
		Manual/ Ultrasonic	TERGAZYME

Animal Cage Cleaning

Equipment to Clean	Contaminants	Method	Recommended Detergent
Animal Cages and Equipment	Organic Bioresidues Feces Blood, Tissue	Manual, Soak	TERGAZYME
		Cage Washer	DETOJET
Urine Scale		Manual, Soak	CITRANOX
		Cage Washer	CITRAJET

Automatic Washers and Spray Rinse

Contaminants	Process	Method	Recommended Detergent
Biosoils Blood Tissue Body Fluids etc.	Small undercounter washers with powder dosing cup	Detergent	ALCOJET Powder
		Acid	CITRAJET Liquid
	Larger washers with liquid dosing systems	Detergent	SOLUJET
			CITRAJET Acid Rinse

Troubleshooting and Validation Services

Contact Alconox, Inc. for critical cleaning, residue-interference troubleshooting, and cleaning-validation assistance services.

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**Before:**

Oven parts show corrosion and structural issues, in part from excessive chloride in water supply.

**After:**

Cleaning with CITRAJET has removed corrosion and re-passivated internal oven parts.

PASSIVATION

Using acid to protect stainless steel parts from corrosion

Passivation is the process of forming a passive layer of chromium oxide on the surface of stainless steel to protect it from corrosion. This is done by adding a chemical that removes free iron and allows chromium oxide to form. The reference for passivation of stainless steel is ASTM A967. See the Critical Cleaning Procedures section of this guide for passivation tests.

CITRANOX and CITRAJET for passivation applications— safety, efficacy and ease of use

- May be used at a 30% concentration in water at a temperature of 140 degrees F for 20–30 minutes
- Exact conditions will vary depending upon the type of stainless steel and surface finishing
- Recommended for manual soaking or soaking in an ultrasonic tank
- If applied by a spray system where there is agitation of the air, CITRAJET should be used at the same conditions listed for CITRANOX
- Much safer and effective than using nitric acid formulations for passivation





LABORATORY

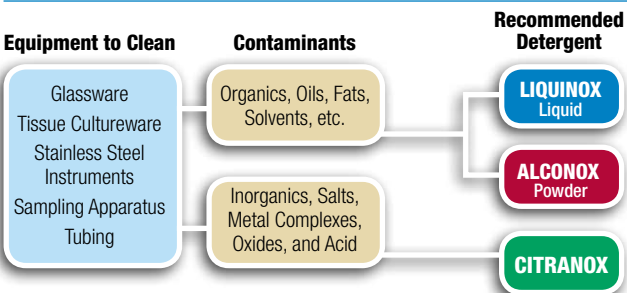
Clean and prolong the life of reusable labware, while eliminating residues

Laboratory procedures can be compromised by interfering residues that prevent reliable results. At the same time, labware and instrumentation budgets are wasted by cleaners that etch, cloud or damage labware surfaces. Alconox, Inc. detergents remove interfering residues without causing equipment deterioration—even when handling tough proteinaceous soils or radioisotope decontamination.

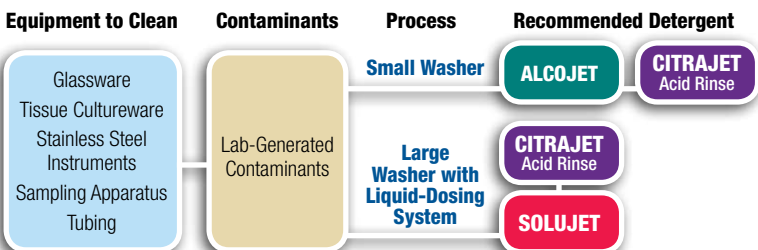
Formulated for all lab cleaning applications, Alconox, Inc. products work effectively and economically without the hazards of strong acids and solvents, and they are free rinsing, corrosion inhibiting and biodegradable. Alconox, Inc. cleaners meet state requirements for lot-specific inhibitory residue tests, and are supported with rinse-water detection methods for accreditation per the College of American Pathologist (CAP) inspection questionnaire. See www.alconox.com for more information.

Alconox cleaners handle everything from lab glassware to ceramics and metal

Manual Lab Washing



Machine Washing



Automatic Siphon Pipet Washer



Before:

Dirt, bacteria, reagents, reaction products and residues can stick to lab glassware.

After:

LIQUINOX gets laboratory soils out, leaving no interfering residue. Surfaces stay clear, clean and readable.

Troubleshooting and Validation Services

Contact Alconox, Inc. for critical cleaning, residue-interference troubleshooting, and cleaning-validation assistance services.

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Before:

Environmental field tests subject equipment to chemically aggressive environments.



After:

Mass-spec equipment blanks show LIQUINOX leaves no interfering trace levels of contaminants.

ENVIRONMENTAL

The practical, safe choice for cleaning field sampling equipment without cross-contamination

Accurate environmental testing of ground or surface water, soil or sediment requires the use of clean instruments, free of cross-contamination. From delicate pH meter probes to bailers, split-spoon samplers, augers, dredges and flow-through cells, each requires the appropriate process and detergent. Alconox, Inc. aqueous detergents help maintain the level of testing accuracy required by EPA guidelines—without the risks and hazards associated with solvents. The following equipment is subject to laboratory detergent cleaning guidelines:

- Automatic wastewater sampling equipment
- Silastic rubber pump tubing
- Sounders for measuring ground-water levels
- Submersible pumps and hoses for purging ground-water wells
- Portable augers
- All miscellaneous sampling and flow-measuring equipment

Specifically, United States EPA Environmental Services Division standard cleaning procedures require a “phosphate-free laboratory detergent such as LIQUINOX” for Teflon®, glass and stainless steel equipment used to sample trace organic compounds or metals.



ALCONOX environmental cleaning products for field and lab applications

LIQUINOX

- High-emulsifying phosphate-free formulation, with a unique blend of free-rinsing ingredients
- No post-rinse contaminating residues; no interference with phosphate-sensitive analytical equipment
- Convenient handling—small quantities can be safely disposed of after use without special procedures or precautions

SOLUJET Liquid

TERGAJET Powder

CITRAJET Acid Rinse

- Reliable results in laboratory dishwasher cleaning of sampling equipment and containers
- Phosphate-free
- Tergajet for under-counter washers with powder cup dosing
- Solujet for larger washers with liquid dosing systems

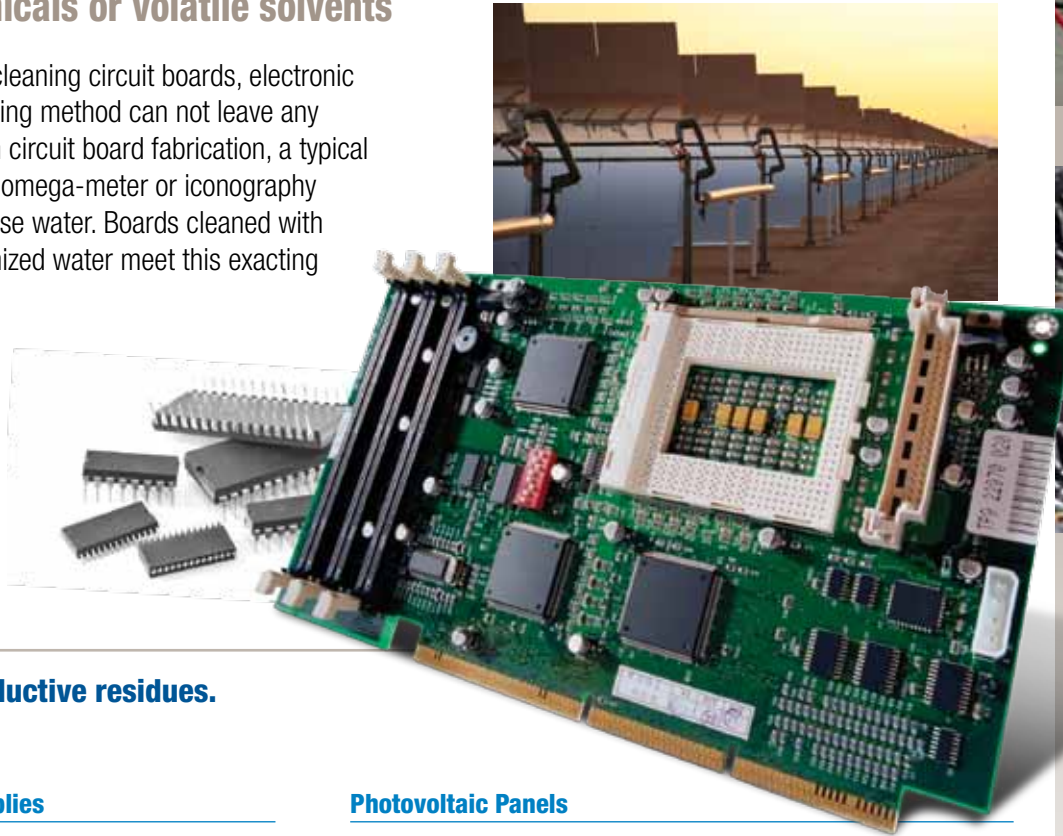
TERGAZYME

- Recommended for samples containing biological contamination

ELECTRONICS & PHOTOVOLTAIC

High-performance aqueous cleaners for exacting electronic applications—without hazardous chemicals or volatile solvents

The bottom-line requirement when cleaning circuit boards, electronic parts or assemblies is that the cleaning method can not leave any conductive residues. For example, in circuit board fabrication, a typical check for impurities may employ an omega-meter or iconography to detect metal salts in the board rinse water. Boards cleaned with DETERGENT 8 and rinsed with deionized water meet this exacting standard of cleanliness.



**ALCONOX detergents: No conductive residues.
No environmental footprint.**

Electronic Components and Assemblies

Materials to Clean	Contaminants	Process	Recommended Detergent
Glass substrates before diachronic coating of electronic parts Infrared detectors during manufacturing and assembly Electrical contacts and leads Ceramic insulators and components	Oils Resins Rosins Flux Conductive Residues	Manual/ Ultrasonic	DETERGENT 8
		Spray	

Photovoltaic Panels

Materials to Clean	Contaminants	Recommended Detergent
Thin Film Monocrystalline Polycrystalline	Manufacturing Oils Debris	DETOJET
	In the Field Environmental Contaminants Dirt Oils	LIQUINOX



Before:
Oils, resins, rosins and flux contaminate soldered connections on printed circuit boards.



After:
DETERGENT 8 de-fluxes and removes ionic contamination without the problems associated with CFCs or solvents.

Troubleshooting and Validation Services

Contact Alconox, Inc. for critical cleaning, residue-interference troubleshooting, and cleaning-validation assistance services.

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**Before:**

Brass forgings corrode and lose their bright appearance unless they're bright-dipped.

**After:**

CITRANOX cleans, removes corrosion and brightens metal surfaces without the disposal problems associated with solvents.

PRECISION MANUFACTURING

Alconox detergents work without solvents or strong acids

In precision manufacturing, surfaces free of interfering residues are critical to processes and quality. Alconox, Inc. detergents provide manufacturers easy-to-use, biodegradable agents for precision manufacturing applications such as cleaning oil from machine rollers, removing mold-release agents from plastic parts, cleaning stampings and castings, and many more. Almost any glass, plastic, metal, rubber, or porcelain surface can be safely, effectively and economically cleaned with an Alconox, Inc. detergent.



Alconox cleaners for applications from plasma lasers to aluminum parts

CITRAJET

- Cuts through surface oils to brighten and remove oxides, scales and corrosion from brass, copper, and stainless steel

CITRANOX

- Removes everything from cutting oils to trace impurities from precision parts

LUMINOX

- Use for cleaning aluminum in parts washers

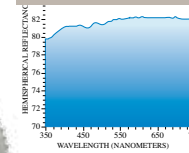
SOLUJET

- Superior surfactant system for high-efficiency oil removal
- Rinses freely to an interfering residue-free surface

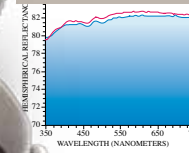
OPTICS

Ensuring the accuracy of data acquired through optical devices

Alconox, Inc. cleaning agents meet the two key criteria for optical applications. First, they contain no abrasive substances that could damage glass or quartz surfaces. Second, Alconox, Inc. detergents leave no residues to affect light transmission or spectral sensitivity. Alconox, Inc. products have been successfully used in a wide range of optical industries and applications, such as cleaning the fiber-optic glass for endoscopes and borescopes, removing liquid monomers used in the manufacture of microscope and telescope lenses, and cleaning calibration screens in light-detection instruments.



Before:
Reflectance of calibrating screen in the ultra-violet to the near-infrared region before cleaning with LIQUINOX.



After:
After cleaning with LIQUINOX, the material shows no adverse change in hemispherical reflectance or change in wavelength.

Alconox detergents for maintaining the performance of sensitive optics in manual, soak and ultrasonic cleaning



- Free-rinsing, with no abrading compounds
 - Clean without leaving films, oils or other data-corrupting residues
 - Prolong the life of costly equipment through repeated cleanings
-
- Mild acid removal of metal oxides

Troubleshooting and Validation Services

Contact Alconox, Inc. for critical cleaning, residue-interference troubleshooting, and cleaning-validation assistance services.

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Before:

Reverse osmosis membranes must be cleaned to yield required flow-through rates without contaminating food products.



After:

After cleaning with TERGAZYME, diaphragm shows required drop in pressure differential and increased permeation flow.

FOOD, BEVERAGE & WATER PURIFICATION

Maintain sanitary processing conditions in accordance with stringent guidelines

Critical cleaning of food, beverage and dairy processing equipment has a direct impact on the quality of food and beverage products. Alconox, Inc. food-grade cleaners are effective for cleaning and prolonging the service life of food processing equipment—including difficult food-grade dairy cleaning, or UF and RO installations.

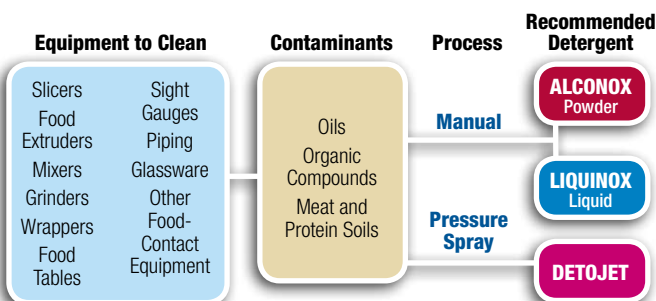
Alconox, Inc. detergents are authorized by the United States Department of Agriculture (USDA) for use in federally inspected meat and poultry plants. And many food and beverage processors prefer Alconox, Inc. detergents for their ability to remove stubborn meat and milk soils without leaving interfering residues.

From pilot labs to full production, packaging and bottling, Alconox manual, automatic and clean-in-place detergents help food, dairy and beverage processors maintain product purity to agar-plate-proven standards, increase throughput and improve profitability.

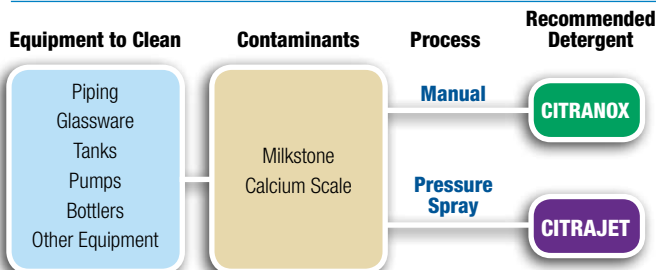


Helping achieve higher yields with less waste

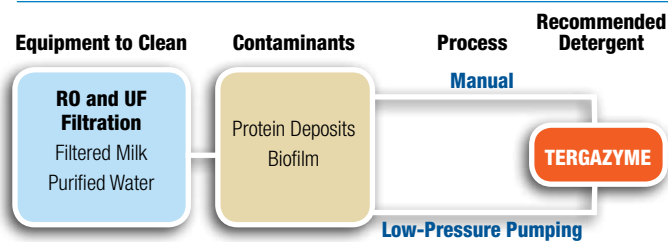
Food Processing Equipment



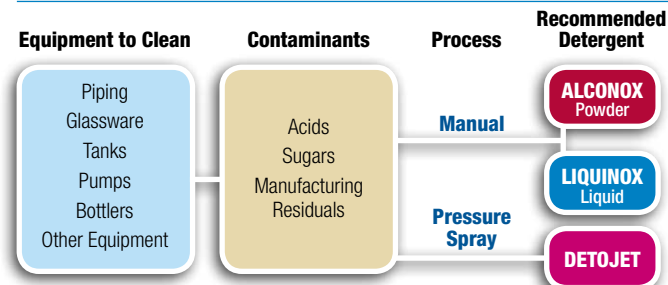
Dairy Processing Equipment



Filtration Processes



Sodas, Teas, Sport & Other Drinks



RESTAURANT & FOOD SERVICE

The right recipe for effectively solving critical restaurant cleaning challenges

From quick service restaurants to wine tasting rooms, when restaurant owners, managers, chefs, and culinary school managers are faced with a stubborn cleaning issue, they put in an order for Alconox, Inc. cleaners.

Whether restoring wine glasses to their original sparkling, residue- and scent-free condition, degreasing frying equipment, or removing water scale from holding cabinets and steamers, Alconox, Inc. products help food service providers cut cleaning time, save labor costs and maximize quality and consistency.



Before:
Fryer shows excessive carbon build up and polymeric residues.



After:
Cleaning with ALCONOX removes both carbon and oil-degrading residues ensuring extended oil life with regular use.

Alconox concentrated formulas extend budgets by reducing scrubbing time

Cooking Equipment

Equipment to Clean	Contaminants	Process	Recommended Detergent
Fryers Cookware Food-prep Equipment	Oils Food Carbon	Soak or Manual Cleaning	ALCONOX
		Heavy-duty Soak, Manual or Spray Wash	ALCOJET

Raw Protein

Equipment to Clean	Contaminants	Process	Recommended Detergent
Countertops Prep Areas Floors and Walls	Raw Meat Proteinaceous Biological Microbial	Manual	TERGAZYME

Scale, Starch and Milkstone

Equipment to Clean	Contaminants	Process	Recommended Detergent
Rethermalizer Pasta Cookpot Holding Cabinet Steamer Stainless Steel	Water Spots Scale Starch Milkstone Corrosion	Manual	CITRANOX
		Spray	CITRAJET

Fine Glassware

Equipment to Clean	Contaminants	Process	Recommended Detergent
Wine Glasses Flutes Carafes Decanters Barware	Wine Residues and Sediment Food Residues Fats and Oils Fingerprints Lipstick Water Spots	Hand Wash	LIQUINOX
		Automated Wash	ALCOJET

Alconox Foodservice Solutions

Visit www.AlconoxFoodService.com to learn about our full line of foodservice products and applications with easy-to-use instructions and videos.



Before:

Titanium dioxide and other cosmetic ingredients can be tough to remove from stainless steel kettles.



After:

SOLUJET removes titanium oxides ensuring clean surfaces for your next batch.

COSMETICS

Shorten cleaning time for silicon, titanium dioxide and other hard-to-clean residues

Concentrated for economical use, Alconox, Inc. detergents make critical cleaning for cosmetic applications faster, easier and more efficient. Whether you're scrubbing 1,500-gallon kettles or wrestling with plastic tubes and fillers, proven detergents such as CITRANOX, TERGAZYME, and ALCONOX wash away the most tenacious materials without leaving residues.

Our experts can help you improve your cleaning procedures, install new procedures, eliminate cross-contamination and ensure compliance with FDA standards. Whatever your cosmetic-related cleaning problem, Alconox, Inc. can help you solve it.



Shorten or eliminate manual scrubbing times with Alconox cleaners

Cosmetics Cleaning Processes

Equipment to Clean	Contaminants	Process	Recommended Detergent
Kettles Mills Mixers Feeders Pumps Tubes Fillers Presses Glassware	Suntan Lotions Cremes Ointments Powders Mascara	Manual	ALCONOX
		Pressure Spray/CIP	SOLUJET

Special Applications

Contaminants	Process	Recommended Detergent
Titanium Dioxide (TiO ₂)	Cold Spray CIP	5% SOLUJET
Zinc Oxide (ZnO)	Cold Spray CIP	5% CITRAJET
Proteinaceous Materials	Manual/Soak/Ultrasonic	TERGAZYME

DETERGENT SELECTION GUIDE

APPLICATION KEY CONCERNS	ARTICLES CLEANED/ SOIL REMOVED	CLEANING METHOD	CLEANER: Powder	Liquid
Healthcare/Veterinary Effective preparation for sterilization, longer instrument life. Reduce waste.	Surgical, anaesthetic, and examining instruments and equipment. Catheters and tubes.	Manual, Ultrasonic, Soak Machine washer, sani-sterilizer	ALCONOX ALCOJET	LIQUINOX DETOJET
	Blood, body fluids, tissue on instruments.	Manual, Ultrasonic, Soak	TERGAZYME	
	Titanium dioxide, petrolatum, oils, emulsions, ointments, carbopols, lacquers, zinc oxides, proteins, steroids, alcohols, sugars, and Eudragit* (L/S/L30/D55/NE30D) polymers.	Manual, Ultrasonic, Soak Machine washer, power wash, CIP	ALCONOX ALCOJET TERGAJET (p-free)	LIQUINOX SOLUJET
Pharmaceutical/Medical Device/ Biotechnology Passing cleaning validation for FDA good manufacturing practices. For stainless steel, glass, plastic, elastomer cleaning.	Inorganic residues, salts, metallics, pigments. Eudragit* (E/RL/RS/E100) polymers, amphoteric, coatings, amines, ethers, starches, alkaloids.	Manual, Ultrasonic, Soak Machine washer, power wash, CIP		CITRANOX CITRAJET
	Protein/ferment residues. R/O, U/F membranes.	Manual, Ultrasonic, Soak	TERGAZYME	SOLUJET
	Glass, metal, plastic labware, ceramics, tissue culture, porcelain, clean rooms, animal cages, bioreactors, tubing, benches, safety equipment.	Manual, Ultrasonic, Soak Machine, power spray, labware washer, washer-sterilizer, cage-washers	ALCONOX ALCOJET TERGAJET (p-free)	LIQUINOX (p-free) DETOJET SOLUJET (p-free)
Laboratory/Environmental Reproducible results, no interfering residues, extending equipment life. Keep laboratory accreditation. Laboratory safety.	Tubes, reusable pipets.	Siphon-type washer-rinsers	ALCOTABS (tablet)	
	Microbiology, water lab, and environmental sampling. Phosphate-sensitive labware. EPA procedures. (Acid for water rinse cycle.)	Field, Manual, Ultrasonic, Soak Machine washer, labware washer	TERGAJET TERGAJET	LIQUINOX SOLUJET-base CITRAJET-acid
	Radioactive equipment/contaminants. Stopcock grease.	Manual, Ultrasonic, Soak Machine washer, warewasher	ALCONOX ALCOJET	LIQUINOX SOLUJET
	Trace metals, metal oxides, scale, salts, starches, amines.	Manual, Ultrasonic, Soak Machine washer, warewasher		CITRANOX CITRAJET
	Proteinaceous soils, bio-wastes, tissue, blood and other body fluids, fermentation residues.	Manual, Ultrasonic, Soak Glassware washer	TERGAZYME ALCOJET	SOLUJET
	Glass, ceramic, porcelain, stainless steel, plastic, rubber. Oils, chemicals, particulates.	Manual, Ultrasonic, Soak Machine washer, power wash	ALCONOX ALCOJET TERGAJET (p-free)	LIQUINOX DETOJET SOLUJET (p-free)
	Aluminum, brass, copper, and other soft metal parts. Oils, chemicals, particulates (acid for oxides, salts, buffing compounds).	Manual, Ultrasonic, Soak Parts washer, power wash	ALCONOX TERGAJET (p-free) ALCOJET TERGAJET (p-free)	LIQUINOX-base CITRANOX-acid SOLUJET-base CITRAJET-acid
	Inorganics, metallic complexes, trace metals and oxides, scale, salts, metal brightening.	Manual, Ultrasonic, Soak Parts washer, power wash		CITRANOX CITRAJET
	Silicone oils, mold-release agents, buffing compounds.	Manual, Ultrasonic, Soak Parts washer, pressure spray	ALCONOX ALCOJET	CITRANOX SOLUJET
	Delicate substrates/neutral for waste.	Manual, Ultrasonic, Soak Machine wash, pressure spray		LUMINOX (Neutral pH)
Electronics Avoid conductive residues, avoid CFCs, pass cleaning criteria.	Circuit boards, assemblies, screens, parts, conductive residues, resins, rosins, fluxes, particulates, salts.	Manual, Ultrasonic, Soak Machine washer, power spray board and screen washers		DETERGENT 8
	Ceramic insulators and components.	Manual, Ultrasonic, Soak Parts washers	ALCONOX ALCOJET	LIQUINOX SOLUJET
	Stainless steel, glass, and food production equipment.	Manual, Ultrasonic, Soak Machine wash, pressure wash, CIP	ALCONOX ALCOJET	LIQUINOX DETOJET
Foodservice & Food Manufacturing Avoid interfering residues on food-contact equipment and effectively remove soils commonly found in food operations. For complete foodservice detergent selection guide, visit AlconoxFoodservice.com.	Oxides, scale, trace metals, salts, milkstone and corrosion.	Manual, Ultrasonic, Soak Machine wash, pressure wash, CIP		CITRANOX CITRAJET
	Filter membranes, proteins, biofouling.	Manual, Ultrasonic, Soak	TERGAZYME	
	Product contact surfaces (acids for pigments and salts).	Manual, Ultrasonic, Soak	ALCONOX	LIQUINOX-base CITRANOX-acid
		Parts washers, power spray	ALCOJET	SOLUJET-base CITRAJET-acid
Cosmetics Avoid cross-contamination.		Manual, Soak, Spray		DETERGENT 8
Nuclear Avoid waste interference	Reactor cavities, pipes, tools, protective equipment.	Manual, Soak, Spray		DETERGENT 8

p-free = phosphate-free

* Eudragit is a ® registered trademark of Roehm GmbH & Co.

To purchase detergent contact your laboratory, healthcare, or industrial supply company.

DIRECTIONS FOR USING ALCONOX CLEANERS

DIRECTIONS FOR ALCONOX DETERGENTS

Directions: Dilute detergent (see chart) using warm (about 120°F or 50°C) or hot (about 140°F or 60°C) water. Ambient temperature water may be acceptable, especially for pre-soak. For difficult soils, use very hot water (above 150°F or 65°C) and double the recommended amount of detergent. When cleaning solution may be reused, make up fresh solutions frequently as needed.

Product	Form	Foam	Dilution (%)	Recommended Amount		Minimum Wash Temperature	Usual Wash Temperature	Maximum Wash Temperature
				Oz/Gal	gm/l or ml/l			
ALCONOX	Powder	Yes	1	1 1/4	10	Ambient	Warm	Boiling
TERGAZYME	Powder	Yes	1	1 1/4	10	Ambient	110–120° F	130° F
LIQUINOX	Liquid	Yes	1	1 1/4	10	Ambient	Warm	Boiling
CITRANOX	Liquid	Yes	1–2	1–3	10–20	Ambient	Hot	Boiling
DETERGENT 8	Liquid	No	2–5	2–6	20–50	Ambient	Hot	Boiling
ALCOJET	Powder	No	1/2–1	1/2–1 1/4	5–10	Warm	Hot	Boiling
DETOJET	Liquid	No	1/2–1	1/2–1 1/4	5–10	Ambient	Hot	Boiling
ALCOTABS	Tablet	Yes		(1 tablet per use)		Ambient	Ambient	Boiling
LUMINOX	Liquid	No	2–5	2–6	20–50	Ambient	Warm	Boiling
CITRAJET	Liquid	No	1–2	1–3	10–20	Ambient	Hot	Boiling
TERGAJET	Powder	No	1/2–1	1/2–1 1/4	5–10	Warm	Hot	Boiling
SOLUJET	Liquid	No	1/2–1	1/2–1 1/4	5–10	Ambient	Hot	Boiling

SOAKING

Recommended:

ALCONOX

LIQUINOX

CITRANOX

TERGAZYME

LUMINOX

ALCOJET

DETOJET

CITRAJET

TERGAJET

SOLUJET

DETERGENT 8

Typical Use: To clean small items—hospital catheters and tubes, small metal parts—and large tank interiors, including pharmaceutical and other blending tanks. An excellent pretreatment method for loosening soils and preventing drying prior to further cleaning—especially for labware or medical instruments.

Advantages: Very little physical effort or expense.

Concerns: Extremely dirty articles or difficult soils may require further cleaning.

Directions: Soak, completely submerged in solution, until clean. This may take several hours, depending on the type of soil. Remove and rinse thoroughly.

MANUAL CLEANING

Recommended:

ALCONOX

LIQUINOX

CITRANOX

TERGAZYME

LUMINOX

ALCOJET

DETOJET

CITRAJET

TERGAJET

SOLUJET

DETERGENT 8

Typical Use: For cleaning small articles such as medical examination instruments, labware or circuit boards, and large articles such as process equipment.

Advantages: Versatile, inexpensive, effective.

Concerns: Time consuming and labor-intensive. May not be effective on difficult-to-reach areas requiring presoak, ultrasonic, or machine cleaning.

Directions: Make up cleaning solution as below, or use undiluted detergent on a warm, wet cloth or sponge for nonabrasive scouring. Clean as follows:

- Wet the article with solution by dunking or using a soaked cloth or sponge.
- Clean with a cloth, sponge, cotton swab, brush, or pad that agitates surface soils without marring the surface.
- Rinse thoroughly. Wear gloves, eye protection, and other safety equipment if recommended.

ULTRASONIC CLEANING

Recommended:

ALCONOX

LIQUINOX

CITRANOX

TERGAZYME

LUMINOX

ALCOJET

DETOJET

CITRAJET

TERGAJET

SOLUJET

DETERGENT 8

Typical Use: To clean multiple batches of articles or for fast, convenient cleaning.

Advantages: Fast, effective, reproducible, penetrating cleaning.

Concerns: Capital cost, material tolerance for ultrasonic agitation.

Directions: Make up detergent solution in a separate container.

- Add detergent, run machine 10 minutes to degas, allow heater to heat.
- Place groups of small articles in racks or baskets.
- Align irregularly shaped articles so the long axis of any part faces the ultrasonic transducer (usually the bottom).
- Immerse articles to be cleaned for 2–10 minutes, or longer, as needed. Remove and rinse thoroughly.
- Orient or rotate parts to release air from blind holes.

CLEAN-IN-PLACE

Recommended:

ALCONOX

LIQUINOX

CITRANOX

TERGAZYME

LUMINOX

ALCOJET

DETOJET

CITRAJET

TERGAJET

SOLUJET

DETERGENT 8

Typical Use: For pipe, tank, and filtration systems.

Advantages: Assures clean systems without disassembly.

Concerns: Good circulation in system.

Directions: Make up cleaning solution as above.

- Circulate solution slowly for at least 1/2 hour. Allow several hours for large systems (thousands of gallons), especially with ambient temperature water.
- Drain by pumping in one full system capacity of water.
- Rinse by circulating and draining at least two times the system's water capacity. Some filtration units may require more rinsing.
- For spray clean-in-place use a low foaming detergent to clean. Rinse and flush thoroughly.

MACHINE WASHERS

Recommended:

ALCOJET

DETOJET

CITRAJET

TERGAJET

SOLUJET

DETERGENT 8

Typical Use: For high-volume cleaning using washer-sanitizers, warewashers, conveyor-washers, or spray and pressure washers.

Advantages: Fast, effective, high volume cleaning.

Concerns: Capital cost; article's ability to withstand machine washing conditions.

Directions: Load articles into racks so that open ends face toward spray nozzles. Place difficult-to-clean articles with narrow necks and openings near the center of the rack, open-side down, preferably on special racks with spray nozzles pointing directly into them. Minimize touching between articles. Minimize fluid trapping orientation of parts—optimize drainage.

- Group small articles in baskets to prevent dislodging by spray action.
- Use only low foaming detergent as per machine manufacturer dose instructions. If no instructions, use a 1% solution or 1 1/4 oz. per gallon of wash water. Use more or less as needed.
- Use hot water (above 140°F or 60°C).
- Use CITRAJET as an acid rinse and neutralizer where desired.

Most machines have at least three rinse cycles. Refer to machine manufacturer's directions.

AUTOMATIC SIPHON PIPET WASHING

Recommended:

ALCOTABS

Typical Use: Washing pipets in laboratories.

Advantages: Effective batch pipet cleaning.

Concerns: Pre-soak pipets for best results.

Directions: Completely immerse pipets immediately after use in a presoak solution of ALCOTABS, ALCONOX, or LIQUINOX solution. When ready to clean:

- Drop an ALCOTAB into bottom of washer.
- Place pipets in holder into the washer.
- Turn on cold or warm water at a rate that will fill the washer and completely cover all pipets, then drain to the bottom during each cycle.
- Run water until ALCOTAB has completely dissolved, continue running water to rinse thoroughly (may take an hour to complete washing and rinsing).

For analytical or tissue culture work use distilled or deionized water for final rinse.

OPTIMIZING YOUR CLEANING PROCESS

BATH-O-CARD:

This acronym is formed from the first letter in each of the nine critical variables in cleaning. And each offers opportunities for cleaning process optimization.

Before cleaning — Presoak, prevent residues from drying and hardening, or stop any pre-cleaning procedures that make cleaning more difficult

Agitation — The more agitation, the better. Add or increase scrubbing, ultrasonic, spraying or flowing.

Time — The longer the cleaning, the more available cleaning capacity is used. Until you run out.

Heat — Every 10 degree C increase in cleaning temperature, doubles the cleaning speed. Clean as hot as practical, without damaging your substrate.

Orientation — Surfaces must be oriented to contact cleaning solution and rinse water. Also, rotate parts to release air in blind holes, and rack to prevent holding liquid between surfaces.

Chemistry — Use detergent suitable for the type of residue (acid or alkaline) and cleaning method (low foam for high agitation; high foam for immersion and ultrasonic).

After cleaning — Avoid recontamination and corrosion-causing humidity and heat.

Rinse — Use suitably pure rinse water to avoid rinse-water residues. Hot rinse avoids breaking emulsion and redepositing. Cold rinse reduces corrosion.

Dry — Removing water by alcohol dip, wiping, blowing or centrifuge reduces rinse-water residues and corrosion. (See following section for more information.)

Corrosion inhibition

Corrosion during cleaning is accelerated by the same things that accelerate cleaning: heat, aggressive chemicals, time, and agitation. To reduce metal corrosion, in approximate order of effect, use less heat, corrosion inhibited detergents, lower pH or pH appropriate detergents, shorter cleaning time, and less agitation. Avoid mixed metals in the same bath that form batteries and deposit galvanic oxides. The following techniques may work to limit corrosion, based on the material and/or process involved:

- **Metal:** Use the mildest pH detergent and avoid mixed metals in the same bath.
- **Aluminum:** After abrasion exposes pure metal surface, allow air passivation time prior to cleaning. Use mild acid cleaners such as CITRANOX or CITRAJET to avoid alkaline attack.
- **Plastic:** Use less aggressive cleaners, containing less solvent or surfactant character. Or use lower concentrations of those cleaners, lower cleaning temperatures, less contact time, and less agitation. For stressed polycarbonate and acrylic use surfactant-free DETOJET for cleaning. Unstressed material is not a concern. Avoid alkaline cleaners on polyurethane.
- **Mild sensitive steel:** Avoid “flash rusting” by rinsing with cold water and using rapid water-removing drying techniques such as dipping in isopropyl alcohol to form an evaporating azeotrope that removes water safely, centrifuge dry, wipe dry, air knives, and drying with oxygen-free gas such as dry nitrogen. Or add a suitable corrosion inhibitor to the rinse water, as long as you can tolerate corrosion-inhibitor residues. Do not use evaporative drying such as air drying or oven drying.
- **Sensitive steel:** Clean with an inhibited cleaner and isopropyl alcohol rinse (or add a corrosion inhibitor to the rinse water).
- **Galvanic corrosion:** Avoid mixed metals in the same bath that can form a battery and deposit oxides on one of the metals. For example, many metals will plate out their oxides on aluminum if the two metals are cleaned in

the same bath. Intact stainless steel is generally OK as a mixed metal, but iron, steel, brass, aluminum, bronze and other metals can be a problem mixed with other metals.

Bath life extension and control

For the highest levels of critical cleaning, especially to avoid cross contamination, only freshly prepared solutions should be used. For industrial cleaning applications, however, bath life can be extended while still achieving high levels of cleaning.

Bath life extension techniques:

- Filtering particulates
- Cooling and settling of sludge
- Cooling and skimming oils
- Adding half again as much detergent as the initial load after partially depleting the cleaning life of a bath

Conductivity, pH and % solids by refractometer can be used to measure bath detergent concentration. In general, a pH change of 1 unit toward neutral indicates an exhausted cleaning solution. Under frequent daily use, detergent solutions can rarely be used more than a week, even when being extended.

Free-alkalinity titration can be used to extend bath life where the soils deplete free alkalinity, as follows:

- Titrate a fresh solution to determine free alkalinity
- Titrate the used solution to determine the percent drop in free alkalinity
- Add detergent to the used bath to bring the free alkalinity back to the new-solution level

For example if your initial solution contains 100 ml of cleaner concentrate and there is a 25% drop in free alkalinity, try adding 25 ml of cleaner concentrate to recharge the solution. Perform a new free-alkalinity titration the first few times to confirm that the detergent is linear with respect to free free-alkalinity depletion. This bath-life extension cannot be repeated indefinitely; sludge will eventually form, requiring a fresh solution.



Try a free sample of Alconox detergents

To request free samples:

- Call ++914.948.4040. Please refer to the Detergent Selection Guide on page 13 of this booklet.
- Go to www.alconox.com. Click Get Sample to use our sample request form.

To place an order for Alconox detergent:

- Call your local Alconox dealer. See our website for U.S. and international distributors.
- Visit www.alconox.com

For technical support:

- Contact the Alconox Technical Service Department for help in selecting the best detergent samples for your application.
- Call ++914.948.4040, email cleaning@alconox.com or fill out the “Ask Alconox” questionnaire at www.alconox.com.

FREE BOOK (\$39.95 value) & SAMPLE OFFER of Alconox critical cleaning detergents

Receive a **FREE copy** of *The Aqueous Cleaning Handbook* just for testing the Alconox cleaners. Authoritative and based on real-world application experience, this practical guide explains what aqueous cleaners are, how they work, how to select and test them, and how to specify cleaning systems.

Please fill out, save, and email PDF file to: Samples@alconox.com



NOTE:
Please complete all sections so we can send the right samples for your application.

Cleaning requirements and use

What surfaces are you cleaning?

- ☐ Polycarbonate, acrylic, and other sensitive plastics
- ☐ Filters, membranes, RO or UF systems
- ☐ PC boards, wafers, electronic components
- ☐ Pipets in syphon washers
- ☐ Soft metals: aluminum, copper, brass, other non-ferrous
- ☐ Stainless steel, iron, nickel
- ☐ Glass, ceramic, porcelain, rubber, fiberglass, plastic
- ☐ Other (please describe) _____

What soils are you removing?

- ☐ Proteinaceous soils, blood and other body fluids, tissue
- ☐ Inorganic soils, scale, salts, metallic complexes, metal oxides, trace metals
- ☐ Silicone oils, mold-release agents, buffing compounds, radioisotopes, radioactive contaminants
- ☐ Oils, cutting fluids, chemical, solvents, bio-residues, particulates, laboratory soils
- ☐ Heavy oils, greases, baked-on residues
- ☐ Conductive residues, resins, rosins, solder, fluxes, particulates, salts
- ☐ Other (please describe) _____

What would you use the cleaner for?

- ☐ Household uses
- ☐ Labware
- ☐ Field sampling equipment
- ☐ Other re-usable items/instruments
- ☐ Filtration membranes
- ☐ Large manufacturing equipment
- ☐ Manufactured items
- ☐ Selling/distribution
- ☐ Restaurant equipment and facilities
- ☐ None of the above

How are you cleaning?

What type of cleaner do you want to use?

- ☐ Liquid cleaner
- ☐ Powder cleaner
- ☐ Either / not sure

If you clean by immersion, how?

Method	Brand	Age (yrs)
<input type="checkbox"/> By Hand		
<input type="checkbox"/> Soak or circulate clean-in-place		
<input type="checkbox"/> Syphon pipet washer		
<input type="checkbox"/> Ultrasonic		
<input type="checkbox"/> Other non-spray		

If you clean by machine, which do you use?

Type	Brand	Age (yrs)
<input type="checkbox"/> Glassware washer		
<input type="checkbox"/> PC board washer		
<input type="checkbox"/> CIP spray		
<input type="checkbox"/> Parts washer		
<input type="checkbox"/> Washer/sanitizer		
<input type="checkbox"/> Power spray wand		
<input type="checkbox"/> Solvent vapor/soak		
<input type="checkbox"/> Other		

Is there an acid rinse cycle?

☐ Yes ☐ No

Are you willing to receive hazardous corrosive liquid detergent samples if the questionnaire indicates that they should be tested for your application?

☐ Yes ☐ No

If you use cleaning machinery, are you planning to purchase new, upgrade, or replace it in the near future?

☐ Yes ☐ No

What size/how often do you purchase high-quality cleaners?

- _____ units (single boxes or bottles) ☐ Wkly ☐ Mthly ☐ Yrly
- _____ cases (of boxes or bottles) ☐ Wkly ☐ Mthly ☐ Yrly
- _____ medium sizes (50-100 lb or 5-15 gal drum) ☐ Wkly ☐ Mthly ☐ Yrly
- _____ bulk sizes (300 lb or 55 gal drum) ☐ Wkly ☐ Mthly ☐ Yrly

Estimated annual purchases of high-quality cleaners (US \$): _____

Detergent

Do you currently use an Alconox, Inc. detergent? ☐ Yes ☐ No

Which are you using? _____

Issues, comments, concerns

Are you having any problems with the cleaner? _____

Any special waste treatment/disposal concerns? _____

Your principal activity:

- ☐ Healthcare or Veterinary
- ☐ Laboratory
- ☐ Environmental & Water Testing
- ☐ Electronics
- ☐ Pharmaceutical
- ☐ Food & Beverage
- ☐ Cosmetics
- ☐ Metalworking
- ☐ Optical
- ☐ Nuclear
- ☐ Educational Institution
- ☐ Medical Device Manufacturing
- ☐ Precision Manufacturing
- ☐ Food Service
- ☐ Tattoo
- ☐ Other

If Other, please describe: _____

Your primary job function:

- ☐ Administrative Assistant
- ☐ Consultant
- ☐ Corporate Management
- ☐ Engineer
- ☐ Healthcare
- ☐ Laboratory Manager
- ☐ Plant Manager
- ☐ Purchasing
- ☐ QC/QA Validation
- ☐ Restaurant Manager
- ☐ Safety/Regulatory Compliance
- ☐ Sales/Marketing/Distribution
- ☐ Scientist/Researcher/Teacher
- ☐ Stockroom/Store/Warehouse
- ☐ Technician
- ☐ Other

If Other, please describe: _____

Special complimentary book offer (\$39.95 value)

The Aqueous Cleaning Handbook

- I agree to try the samples being sent as a result of this request
 - I agree to let Alconox know the results of my sample trial by completing the sample report card (will be included with samples)
 - I understand that I will be billed \$39.95 for the book if I fail to try out the samples and report the results of my trial
- ☐ Please SEND me *The Aqueous Cleaning Handbook*. I agree to terms stated above.

To purchase the book, order on our website or call 1-877-877-2526.

Comments:

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