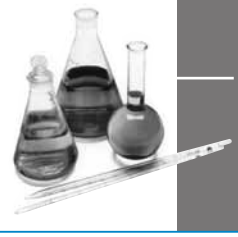
ALCONOX

Medical Device Manufacturing

Pharmaceutical



Laboratory

THE GUIDE TO CRITICAL CLEANING

How to select and use detergents for critical cleaning applications

Cosmetics

Healthcare

Food & Dairy

Electronics

Environmental

Precision Manufacturing

Optics

Alconox: Providing solutions to critical cleaning problems for more than fifty years.

This guide is an attempt to put as much of our half century of experience as possible at your fingertips, to provide a handy source of information.

In this guide, on pages 6–7, you'll find a method-by-method review of critical cleaning procedures. Following, are specific examples of applications for Alconox detergents in healthcare, pharmaceuticals, laboratories, electronics, precision manufacturing, environmental sampling, and food and dairy processing.

At the back you'll find a selection guide that leads you step-by-step to the right Alconox detergent for your application.

And, you will find an opportunity to receive free samples of Alconox products and a copy of *The Aqueous Cleaning Handbook.*

Alconox detergents are available from leading healthcare, laboratory, and industrial suppliers. Alconox invites you to call on our technical service department to help you solve your cleaning problems.

The right cleaning method removes interfering residues, lengthens equipment life, saves you time, and gives you reliable results.

When choosing a cleaning method you need to carefully consider: What are the articles you are cleaning? What are they soiled with? What level of cleaning standard is required?

Additional critical cleaning concerns are the availability of cleaning equipment, water, drainage, and space. Other concerns include cleaning validation guidelines, quality control measures, and protective equipment for manual cleaning.

Also, a key consideration is the environmental impact of your detergents and cleaning procedures. That's why ALL Alconox detergents are biodegradable and meet typical disposal requirements.

For additional help with your cleaning application, to request Alconox Cleaning Analysis Recommendations, or for cleaning validation information, please call our technical services department at 914 948-4040. For safety data, technical bulletins, certificates, and applications, visit www.alconox.com or use the fax-back service at 914 948-4040 and listen to the menu. Online you can even get information, MSDS, and technical bulletins in Chinese, French, German, and Spanish.

Contents

MEDICAL DEVICE MANUFACTURING

Getting medical equipment critically clean for use in demanding human health and veterinary applications.

Whether the equipment is designed for human or veterinary health, manufacturing medical devices—such as the titanium prosthetic hip joint shown at right—often requires equipment cleaned to implantable standards. Whether the product is designed for in vitro or in vivo use, is biomechanical or electronic, you'll find an Alconox cleaner expressly formulated to get products scrupulously clean without leaving interfering residues.

An Alconox cleaner brand for every medical equipment manufacturing application

ALCONOX brand, for example, has been found to be especially well suited in cleaning implants prior to secondary cleaning operations and coating with aluminum plasma spray (TPS) with implants used in both dental applications and medical procedures such as knee, hip, and shoulder replacements.

It not only removes all contaminating residues but its aqueous-blend formulation is also biodegradable and non-volatile—without the disposal and safety problems associated with other metals cleaners.

ALCONOX brand is also well suited to removing interfering residues in high-fidelity, research-quality medical devices such as Doppler flow catheter transducers, eliminating the need for harsh chemicals and ultrasonic cleaning. In addition, it easily removes wax residues from rigid gas permeable (RGP) contact lenses during manufacturing.

And our LIQUINOX brand—which is especially well suited to removing oils from metal and elastomeric-polymer surfaces during manufacturing—has been used in cleaning plastic artificial joint materials prior to testing.

CITRANOX brand cleaner has been successfully used to ultrasonically clean titanium implants and other medical devices in validated GMP cleaning in accordance with quality systems protocols.

Even sensitive aluminum Class I and Class II external medical devices can be cleaned manually or in ultrasonic tanks using LIQUINOX or using SOLUJET in spray parts washers or washer/sterilizers.

Before: Medical devices—such as prosthetic hip joints—must be critically pre-cleaned prior to coating and packaging.

After: Swab tests validate successful cleaning with Alconox-brand detergents.

HEALTHCARE & VETERINARY

Effective sterilization requires effective cleaning—and when it comes to cleaning reusable instruments or equipment, Alconox detergents meet the most demanding criteria.

The ultimate goals of healthcare cleaning procedures are to keep instruments and equipment clean and sterile, prolong their working life, minimize cross-contamination, and reduce medical waste.

The ideal manual detergent for getting reusable items clean has a neutral range pH to prevent corrosion or other surface degradation. When proteinaceous soils or blood must be cleaned, adding an enzyme to the detergent formula means instruments come clean via soaking and gentle cleaning, rather than abrasive scrubbing—thus prolonging their working life and decreasing the chance of bacterial contamination.

LIQUINOX and TERGAZYME brands meet these criterion easily and economically. Thanks to its neutral range pH, LIQUINOX not only cleans stainless and chrome-plated surgical instruments effectively, but also those made from other materials—even gold-plated instruments. It cleans aluminum, brass, copper, plastics and rubber, titanium, and tungsten carbide drill tips. Sequestrants in LIQUINOX prevent water scale and calcium deposits that can leave residues and promote corrosion. And because they are concentrated, these detergents are economical to use.

ALCOJET and SOLUJET are excellent for use in cartwashers or washer-sanitizers where efficient corrosion-inhibited alkaline cleaners are required. Use CITRAJET for mild organic acid rinsing and neutralizing.

Loosen baked and dried-on soils without scrubbing

For removing scale, protein, and heavy soil loads, TERGAZYME protease enzyme detergent is especially effective in instances where soiled instruments have dried or are heat sterilized prior to cleaning, a step taken in some facilities as a precaution against infection transmission. Soaking in TERGAZYME assists in subsequent cleaning to ensure that corrosive dried-on blood is removed and abrasive cleaning is not required.

Alconox offers a broad range of detergents for hospital and healthcare cleaning, available in liquid or powder form, for manual, machine, ultrasonic, or soaking.

Before: Blood dried onto scalpel handles is tough to remove.

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

For specific detergent recommendations see pages 6–8. For free detergent samples call 914-948-4040.
To order detergent, visit www.alconox.com, or contact a leading healthcare, laboratory, or industrial supply company.

ENVIRONMENTAL

In ground water, surface water, soil or sediment sampling, field-proven Alconox detergents get sampling equipment clean while preventing cross-contamination.

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 testing requires taking water and soil samples

Recognizing the importance of critically clean sampling equipment, the Engineering Support Branch of the EPA's Environmental Services Division has set up standard procedures that require the use of "phosphate-free laboratory detergent such as LIQUINOX" in cleaning Teflon®, glass, and stainless steel equipment used for sampling trace organic compounds or metals.

Automatic wastewater sampling equipment is also subject to laboratory detergent cleaning guidelines, as are silastic rubber pump tubing, as well as sounders used to measure groundwater levels, submersible pumps and hoses for purging ground water wells, portable augers, and all miscellaneous sampling and flow-measuring equipment.

The practical, safe choice in environmental testing

From bailers, split-spoon samplers, augers, dredges, flow-through cells, to delicate pH meter probes, Alconox aqueous detergents help maintain the level of testing accuracy you need—without the risks and hazards associated with solvents—to comply with EPA guidelines.

Our field-proven LIQUINOX brand contains a unique blend of free-rinsing ingredients, leaving no post-rinse contaminating residues and no opportunity for the cleaner to interfere with phosphate-sensitive analytical equipment.

In addition, LIQUINOX liquid cleaner can be handled more conveniently. And, because the cleaner is phosphate-free, small quantities can be safely disposed of after use without requiring special procedures or precautions.

And for cleaning stubborn hydrocarbon residues, nothing beats the solvating and coupling action of DETERGENT 8. It keeps contaminating soils suspended in the cleaning solution, preventing their redeposition on cleaned surfaces.

For automated cleaning of sampling equipment and containers in laboratory dishwashers, use phosphate-free SOLUJET liquid or TERGAJET powder for reliable results.

Alconox, Inc. offers a broad range of powders and liquids for manual, machine, clean-in-place, and ultrasonic critical cleaning—all free rinsing, corrosion-inhibiting and biodegradable.

LABORATORY

Alconox detergents leave no interfering residues on reusable labware.

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

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

Residues that interfere with laboratory procedures are the invisible enemies of reliable results. Cleaners that can't remove residues without also etching, clouding, or otherwise damaging labware surfaces are enemies of your labware and instrumentation budget.

Alconox detergents not only remove interfering residues without accompanying deterioration of equipment, but also handle tough laboratory cleaning problems such as removing proteinaceous soils or radioisotope decontamination. And Alconox, Inc. can help you pass your inspections for lab accreditation.

From pipets to animal cages

ALCONOX, LIQUINOX, CITRANOX, ALCOTABS, TERGAZYME, DETERGENT 8 and ALCOJET all pass the inhibitory residue test for water analysis. Neutral pH LIQUINOX and LUMINOX are ideal for cleaning phosphate-sensitive analytical ware—in fact an EPA unit lists LIQUINOX as a standard phosphate-free detergent for their guidelines for cleaning sampling equipment and containers. ALCOJET powder, DETOJET liquid, phosphate-free TERGAJET powder, phosphate-free SOLUJET liquid, and CITRAJET acid rinse are specially formulated for machine labware washers. CITRANOX excels at removing trace metals. CITRAJET provides excellent acid rinsing and neutralization in laboratory washers. Use ALCOTABS for pipets and tubes in automatic siphon pipet washers.

Use Alconox detergents all around the lab for cleaning beakers and all lab glassware, tissue cultureware, stainless steel instruments, sampling apparatus, and tubing. Alconox products work effectively and economically, while avoiding the hazards of strong acids and solvents.

Alconox cleaners are supported with rinse water detection methods for passing accreditation with the College of American Pathologist (CAP) inspection questionnaire, as well as provided with lot-specific inhibitory tests to meet NELAC and State water lab inspection requirements—all available online at www.alconox.com.

Whether manual or machine, powder or liquid, phosphate or phosphate-free, Alconox has the right detergent for your application, all free-rinsing, corrosion-inhibiting, and biodegradable.

For specific detergent recommendations see pages 6–8. For free detergent samples call 914-948-4040.
To order detergent, visit www.alconox.com, or contact a leading healthcare, laboratory, or industrial supply company.

ELECTRONICS

High-performance aqueous cleaners from Alconox handle exacting electronic applications without employing hazardous chemicals or volatile solvents.

The bottom-line requirement for cleaning circuit boards or any other electronic part or assembly is that the cleaning method must not have the potential to leave conductive residues.

In circuit board fabrication, a typical check for impurities may employ an omega-meter or ionograph, which detect the presence of metal salts in the board rinse water. Boards cleaned with DETERGENT 8 and properly rinsed with deionized water meet the most exacting standards of cleanliness.

Leaves no conductive residues

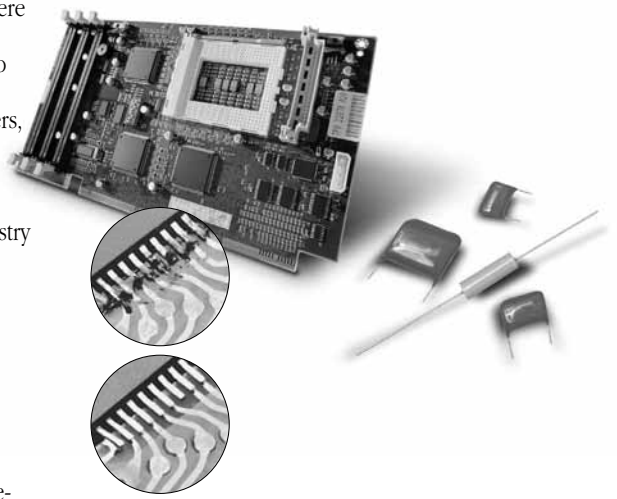
Alconox's DETERGENT 8 is an ideal cleaner for demanding applications in electronics cleaning. Because it contains no conductive metal cations, it cannot leave conductive residues. And, once a part or assembly has been cleaned with DETERGENT 8, it stays clean. Its coupling ability keeps soils suspended in the cleaning solution, preventing redeposition on cleaned material. In addition, as used, the solution is non-flammable and corrosion-inhibited, and can be used for manual, ultrasonic, or spray machine cleaning.

While DETERGENT 8 meets the most demanding critical cleaning requirements, there is another compelling reason for its use in electronics—it is an aqueous cleaner, with no ozone-depleting potential and low volatile organic content. And, like all Alconox cleaners, DETERGENT 8 is biodegradable and meets typical disposal requirements.

DETERGENT 8 and other Alconox detergents are used in a variety of electronic industry cleaning applications, including:

- Cleaning glass substrate before dichroic coating of electronic parts
- Cleaning during manufacturing and assembly of infrared detectors
- Cleaning electrical contacts and leads
- Cleaning ceramic insulators and components

Whether cleaning through-hole or surface-mount boards, DETERGENT 8 does the job effectively, economically, and without CFC hazards. LUMINOX can even be used with aluminum substrates.



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

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

PRECISION MANUFACTURING

From bright-dipping brass forgings to cleaning stampings and castings, Alconox detergents clean without the disposal and use hazards of solvents or strong acids.

In metalworking, a part's appearance often defines the quality of that part—and of the final end product itself. In precision manufacturing, surfaces free of interfering residues are critical. Alconox detergents provide manufacturers with an easy-to-use, biodegradable medium for getting surfaces critically clean.

From bright-dipping brass forgings, stampings, and castings for a high-quality surface finish to cleaning medical devices, whether the job involves removing cutting oils or even trace impurities from precision parts, CITRANOX brand detergent performs consistently, economically, and effectively—without the hazards associated with solvents or strong acids. SOLUJET cleaner has a superior surfactant system for high-efficiency oil removal while still rinsing freely to an interfering residue-free surface.

From plasma lasers to lenses and optical parts

Take a look, for example, at the superior cleaning capabilities of CITRANOX in just one extremely critical process.

A gas plasma laser, which uses an aluminum chamber in which inert gases receive very large electrical currents, must be absolutely free of surface debris and oxides. If not, the result may be poor performance at best and dangerous conditions at worst. CITRANOX easily achieves the scrupulously clean interior surfaces these devices require.

Other examples of Alconox cleaners used in precision cleaning are:

- Cleaning oil from steel rolls used in plate glass production
- Removing mold-release agents from plastic parts
- Cleaning film processing machine rollers
- Ultrasonic cleaning of jet engine parts during overhaul procedures
- Ultrasonic cleaning of turbine fuel nozzles

In fact, almost any glass, plastic, metal, rubber, or porcelain surface can be safely, effectively, and economically cleaned with an Alconox detergent. There is even a low foaming neutral pH LUMINOX detergent for use in aluminum cleaning in parts washers. There is also a low-foaming, organic acid CITRAJET cleaner to cut through surface oils and brighten and remove oxides, scales and corrosion from brass, copper, and stainless steel.

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

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

For specific detergent recommendations see pages 6–8. For free detergent samples call 914-948-4040.
To order detergent, visit www.alconox.com, or contact a leading healthcare, laboratory, or industrial supply company.

FOOD & DAIRY

Alconox detergents prolong the life of food, beverage, and dairy-product processing equipment—including UF and RO filtration—without leaving interfering residues.

Before: Reverse osmosis membranes must be cleaned to yield required flowthrough rates—without contaminating food products.

After: After cleaning with TERGAZYME brand, diaphragm shows required drop in pressure differential—with an increase in permeation flow.

Critical cleaning of food, beverage, and dairy processing equipment such as slicers, food extruders, mixers, grinders, wrappers, food tables, sight gauges, piping, glassware, and other food-contact equipment has a direct effect on the quality of food and beverage products requiring the maintenance of sanitary conditions in accordance with stringent guidelines.

Alconox detergents such as CITRANOX, TERGAZYME, LIQUINOX, and ALCONOX, have long been used in food and beverage processing for their ability to remove even the most stubborn proteinaceous soils without leaving interfering residues.

Helping to yield higher filter membrane outputs with less waste

For example, through whey concentration with reverse osmosis (RO) systems, producers have reduced waste by creating a nutritive, marketable, high-protein concentrate.

In both ultrafiltration (UF) and RO filtration of whole and skimmed milk as well as cheese whey, TERGAZYME brand's unique protease enzyme detergent formula is effective in cleaning UF and RO membranes to maintain high flow rates and desired rejection of dissolved solids—while rinsing away to leave no interfering residues which could contaminate food products.

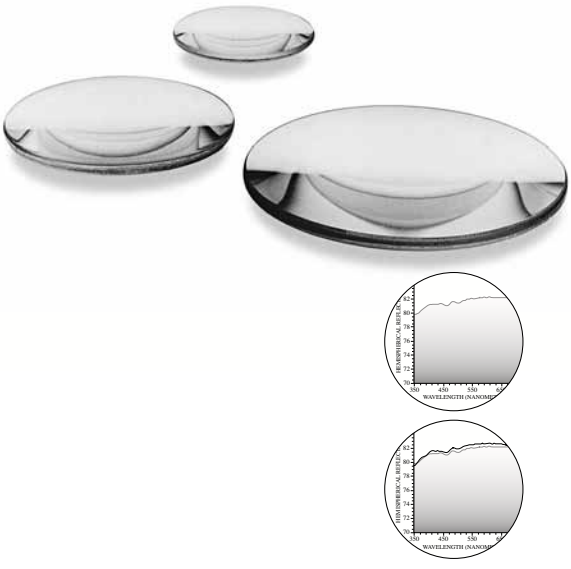
In cheese and milk processing, low-foaming CITRAJET is highly effective at milkstone and calcium scale removal.

From test to pilot labs to full production in food, dairy, and beverage processing, packaging and bottling, Alconox manual, automatic, and clean-in-place detergents help processors preserve product purity—to agar-plate-proven standards—while improving output and profitability.

Alconox, Inc. has a full line of detergents that are authorized by the United States Department of Agriculture (USDA) for use in federally inspected meat and poultry plants.

OPTICS

Ensuring the accuracy of data acquired through microscopic, telescopic, spectrographic, interferometric, and other optic devices starts with Alconox detergents.



Before: Reflectance of calibrating screen in the ultraviolet 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.

Equipment used in such diverse fields as astronomy, remote sensing, machine vision, laser rangefinding as well as biomedical and other microscopic research requires critically clean, calibrated optics to ensure the accuracy of collected data.

Agents used in cleaning such optics must leave no data-corrupting residues that would adversely affect the efficiency of light transmission or spectral sensitivity. They should also contain no abrasive substances that could damage glass or quartz surfaces.

Maintaining the performance of sensitive optics

Free-rinsing LIQUINOX and ALCONOX brand detergents help maintain the performance of sensitive optics without fear of leaving films, oils, or other data-contaminating residues. And since these brands contain no abrading compounds they help prolong the life of such costly equipment—even through repeated cleanings.

They have long been used for cleaning core glasses drawn down to micron ranges for fiber optics used in medical and industrial applications, image transmission devices such as endoscopes for nose and throat inspection as well as remote review of aircraft engines and nuclear tanks.

They have also found application as the preferred cleaning agents for removing liquid monomers used by OEMs in lens manufacturing for both microscopes and telescopes. LIQUINOX brand has even been called on to clean calibration screens used in calibrating a wide range of light detection instruments—without affecting their UV performance.

What do you need to clean? We've been formulating and manufacturing aqueous cleaners for optics for more than fifty years.

For specific detergent recommendations see pages 6–8. For free detergent samples call 914-948-4040.
To order detergent, visit www.alconox.com, or contact a leading healthcare, laboratory, or industrial supply company.

PHARMACEUTICAL & BIOTECHNOLOGY

From tablet presses to mixing tanks, Alconox detergents handle tough critical cleaning jobs—like removing insoluble coatings residues.

Tablet presses don't come clean easily when sustained-release products are involved. Nor do any other processing devices used in the production of sustained-release or timed-release pharmaceuticals. But CITRANOX does the job quickly and safely.

Cleaning protocols vary from manufacturer to manufacturer. But whether the good manufacturing practice test for cleanliness involves wipe or rinse sampling, TOC or HPLC analysis, all punches, dies, and other product-contact parts come critically clean with CITRANOX.

If you need guidelines for your cleaning validation procedures, or you suspect residue interference, call on Alconox technical service for product recommendations and assistance.

Clean virtually all processing surfaces

In fact, virtually any glass, metal, plastic, or porcelain surface in a pharmaceutical or biotechnology manufacturing facility that comes in contact with difficult-to-dissolve substances can be made critically clean with CITRANOX, ALCONOX, or LIQUINOX for manual, immersion and circulate CIP; or use alkaline SOLUJET or acidic CITRAJET for sprayball CIP or automatic washer use. And, they're available in bulk sizes that meet your quality control and record keeping requirements.

Whether you have to clean capsule fillers, centrifuges, comminuters, compactors, conveyors, dryers, filters, filling lines, granulators, kettles, mills, mixers, reactors, or any other pharmaceutical or biotechnology production machinery that must be free of interfering residues, Alconox has an acidic, neutral or alkaline biodegradable detergent that meets typical disposal requirements to do the job.

In fact, almost any glass, plastic, metal, rubber, or porcelain surface can be safely, effectively, and economically cleaned with an Alconox detergent. The superior surfactant systems of SOLUJET or CITRAJET are effective at low concentrations on a wide range of residues without having to use troublesome additives, even on titanium dioxide, petrolatums, lotions, polymeric thickeners, and acrylic coatings.

Alconox detergents are available worldwide with consistent formulations, certificates of analysis online, cooperation with audits and vendor questionnaires, ingredient toxicity data, shelf life information, residue sampling techniques, ingredient disclosure, lot number tracking, and validation support.

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.

COSMETICS

Alconox detergents make short work of silicon, titanium dioxide, and other hard-to-clean residues.

Critical cleaning doesn't have to take hours

Whether you're scrubbing 1,500-gallon kettles or wrestling with plastic tubes and fillers, you need to ensure that the last batch of product you processed really is history. That's where Alconox cleaners come in. Proven detergents such as CITRANOX, TERGAZYME, and ALCONOX wash away your most tenacious cleaning problems—without leaving residues.

CITRANOX, for example, excels in removing trace metals and oxides—including titanium dioxide. TERGAZYME conquers proteinaceous residues. ALCONOX makes short work of silicon residues and even tackles waterproof mascara in heated immersion cleaning. Whatever the surface—glass, plastic, metal, or otherwise—Alconox gets it critically clean.

Want to make your cleaning operations cheaper and more efficient? We can help

Alconox stretches your cleaning budget in two key ways. First, Alconox detergents make your cleaning jobs faster and easier. Scrubbing and rinsing big stainless-steel kettles can take hours. Alconox can shorten—or even eliminate—manual scrubbing time. And that means saving money. Second, Alconox detergents are highly concentrated for economical use. A little bit of any one of them goes a very long way.

We know cleaning. We have more than 50 years of experience in developing and manufacturing cleansers for the most demanding industrial applications.

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

Alconox offers a broad range of powders and liquids for manual, machine, clean-in-place, and ultrasonic critical cleaning—all free-rinsing, corrosion-inhibiting, and biodegradable.

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

After: CITRANOX removes metal oxides completely, ensuring microscopically clean surfaces for your next batch.

For specific detergent recommendations see pages 6–8. For free detergent samples call 914-948-4040.
To order detergent, visit www.alconox.com, or contact a leading healthcare, laboratory, or industrial supply company.

CRITICAL CLEANING PROCEDURES

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 Oz/Gal	Recommended Amount gram/l or ml/l	Minimum Wash Temperature	Usual Wash Temperature	Manual Precautions Protective Gloves	Manual Precautions Eye Protection
ALCONOX	powder	yes	1	1 1/4	10	Ambient	Warm	Desired	Desired
TERGAZYME	powder	yes	1	1 1/4	10	Ambient	Max 130˚ F	Desired	Desired
LIQUINOX	liquid	yes	1	1 1/4	10	Ambient	Warm	Desired	Desired
CITRANOX	liquid	yes	1-2	1-3	10-20	Ambient	Hot	Required	Required
DETERGENT 8	liquid	no	2-5	2-6	20-50	Ambient	Hot	Required	Desired
ALCOJET	powder	no	1/2-1	1/2-1 1/4	5-10	Warm	Hot	Required	Desired
DETOJET	liquid	no	1/2-1	1/2-1 1/4	5-10	Ambient	Hot	Required	Required
ALCOTABS	tablet	yes		(1 tablet per use)		Ambient	Ambient	N.A.	N.A.
LUMINOX	liquid	no	2-5	2-6	20-50	Ambient	Warm	Desired	Desired
CITRAJET	liquid	no	1-2	1-3	10-20	Ambient	Hot	Required	Required
TERGAJET	powder	no	1/2-1	1/2-1 1/4	5-10	Warm	Hot	Required	Desired
SOLUJET	liquid	no	1/2-1	1/2-1 1/4	5-10	Ambient	Hot	Required	Required

SOAKING

Recommended products: ALCONOX, LIQUINOX, CITRANOX, TERGAZYME, LUMINOX, ALCOJET, DETOJET, CITRAJET, TERGAJET, SOLUJET, AND 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 pre-treatment method for loosening soils and preventing drying—especially for labware or medical instruments—prior to further cleaning.
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 (see Rinsing at right).

MANUAL CLEANING

Recommended products: ALCONOX, LIQUINOX, CITRANOX, TERGAZYME, LUMINOX, ALCOJET, DETOJET, CITRAJET, TERGAJET, SOLUJET, AND 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 pre-soak, ultrasonic, or machine cleaning.

Directions: Make up cleaning solution as below, or use undiluted detergent on a warm, wet cloth or sponge for non-abrasive 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 (see Rinsing at right). Wear gloves, eye protection, and other safety equipment if recommended.

ULTRASONIC CLEANING

Recommended products: ALCONOX, LIQUINOX, CITRANOX, TERGAZYME, LUMINOX, ALCOJET, DETOJET, CITRAJET, TERGAJET, SOLUJET, AND DETERGENT 8

Typical Use: To clean large batches of articles or for fast, convenient cleaning.
Advantages: Fast, effective, penetrating cleaning.
Concerns: Capital cost, material tolerance for ultrasonic agitation.

Directions: Make up detergent solution in a separate container.
- Add cleaning solution, run machine for several minutes, to degas solution and allow heater to come up to temperature.
- 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 (see Rinsing at right).

CLEAN-IN-PLACE

Recommended products: ALCONOX, LIQUINOX, CITRANOX, TERGAZYME, LUMINOX, ALCOJET, DETOJET, CITRAJET, TERGAJET, SOLUJET, AND 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 products: ALCOJET, DETOJET, LUMINOX, CITRAJET, TERGAJET, SOLUJET, AND 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.
- 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 (see Rinsing at right). Refer to machine manufacturer's directions.

AUTOMATIC SIPHON PIPET WASHING

Recommended product: 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 pre-soak 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.

CRITICAL CLEANING PROCEDURES

RINSING

Don't neglect the rinse! Use ambient, warm, or hot water. A running water rinse directly contacting all surfaces for at least 10 seconds on each surface is desirable. If not practical, use a series of three or more agitated soak rinse tanks or at least two counter-flow cascade rinse tanks. For large surfaces, several passes with a clean cloth or sponge soaked with rinse water followed by a clean, dry, absorbent wipe can work. In machine cleaning, after washing there should be at least three rinse cycles.

Any quality of rinse water can be used to successfully remove the detergent and soil. The quality of the rinse water determines what rinse water residues can be left behind on the surface being cleaned. The rinse water is the last liquid to touch the surface you are cleaning, whatever is in the rinse water can potentially wind up on the surface. Tap water typically contains varying degrees of organic microbes, particulates, and hardness (calcium and magnesium) salts. If you evaporate tap water onto a surface you can deposit these contaminants—often in the form of water spots. Higher purity water contains less potential contaminants to deposit. In general, distilled water is particularly low in organic contaminants. Deionized water is particularly low in ionic or inorganic contaminants. Reverse osmosis or RO water can be very low in both organic and inorganic contaminants. Tap water is suitable for many rinsing applications.

Give **medical and surgical instruments** a final rinse in distilled or deionized water.

In laboratories, rinse **tissue culture and analytical ware** with deionized or distilled water. Rinse **trace organic analytical ware** in distilled or organic-free water. Give **trace metal or inorganic analytical ware** a final rinse with deionized water.

Rinse **pharmaceutical equipment** according to good manufacturing practice— with whichever is required: potable, deionized, distilled, sterile, pyrogen-free, or injectable water.

Rinse **electronic circuit boards** and non-conducting electronic devices with deionized water.

Sensitive optical or precision manufactured parts may require final rinses in deionized or distilled water.

Food processing equipment must be rinsed with potable water.

DRYING

Drying can affect residues and corrosion. Impurities from rinse water can be deposited during evaporation. To minimize this, dry with techniques that physically remove rinse water from the substrate such as absorbent wiping, forced air or air knives, azeotropic solvent drying such as isopropyl alcohol final rinse and dry, or vacuum drying that may also evaporate residues. Water, and particularly high purity rinse water can be corrosive to metal substrates during heated and air drying. The use of physical removal drying techniques or the addition of corrosion inhibitors (with the tolerance of corrosion inhibitor residues) to the rinse water can help minimize corrosion.

BATH LIFE EXTENSION AND CONTROL

For the highest levels of critical cleaning, only freshly made up solutions should be used for cleaning to avoid any potential for cross contamination. For industrial critical cleaning applications, high levels of cleaning can still be achieved with extended bath life. In general, a pH change of 1 pH unit towards neutral indicates an exhausted cleaning solution. Bath life can also be extended by physical filtration of particulates and cooling and settling of sludge and skimming of oils. Bath life can also be extended by adding one half as much detergent of the initial load after partially depleting the cleaning life of a bath. Under frequent daily use, detergent solutions can rarely be used more than a week even with these bath life extension techniques. Conductivity, pH and % solids by refractometer can be used to control bath detergent concentration.

Free alkalinity titration can also be used to control bath life of alkaline cleaners where the soil being cleaned depletes free alkalinity—as is often the case with oily soils. Titrate a fresh solution to determine new solution free alkalinity. Titrate your used solution to determine the percent drop in free alkalinity. Add more detergent to the bath to bring the free alkalinity back to the new solution free alkalinity. For example if your initial solution is made up with 100 ml of cleaner concentrate and you observe a 25% drop in free alkalinity, you should try adding 25 ml of cleaner concentrate to recharge your solution.

You should perform a new free alkalinity titration to confirm your recharge the first few times you use this recharging method to be sure that the detergent you are using is linear with respect to free alkalinity depletion. This form of bath life extension cannot run indefinitely, sludge will eventually form. Fresh solutions must be periodically made up.

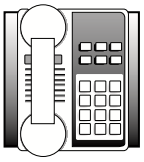
CORROSION INHIBITION

Corrosion during cleaning is accelerated by the same things that accelerate cleaning: heat, aggressive chemicals, time, and agitation. In approximate order of importance, to reduce metal corrosion concerns, use less heat, lower pH detergents, shorter cleaning time, and less agitation.

In general, use the mildest pH detergent to limit metal corrosion. Higher pH detergents SOLUJET and DETOJET have special corrosion inhibitors that allow their use with aluminum. SOLUJET and CITRAJET have inhibitors that allow their use on a broad range of sensitive metals without leaving filming amine residues. In approximate order of importance, in general to reduce plastic corrosion, use less aggressive cleaners that have less solvent or surfactant character or use lower concentrations of those cleaners, use lower cleaning temperatures, use less contact time, and finally use less agitation. With aqueous cleaning metal corrosion can occur during rinsing and drying. Corrosion inhibitors can be added to rinse water provided that any associated inhibitor residue does not interfere with the surface being cleaned. Keeping the surfaces cleaned hot with hot rinse water and using rapid heat or vacuum drying can accelerate drying and minimize metal corrosion. Forced air drying and air knives that physically remove rinse water can minimize drying corrosion. Drying with hot oxygen-free gas such as nitrogen can also control corrosion during drying.

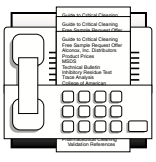
With mild steel you can have "flash rusting" when you rinse with hot water and dry with hot air. In some instances, by lowering the water temperature or drying temperature, corrosion can be avoided on mild steel. For instance in a case where flash rusting on mild steel had been occurring using 150°F rinse water and ambient air drying, rust was avoided by using 120°F in place of the 150°F rinse water. For the most sensitive steel, you can clean with an inhibited cleaner followed by an isopropyl alcohol rinse or using a corrosion inhibitor added to the rinse water.

FOR ADDITIONAL CRITICAL CLEANING INFORMATION



PHONE

Call Alconox Technical Service at 914 948-4040



FAX

- Call 914 948-4040
- Follow the directions to enter your fax number

INTERNET

email: cleaning@alconox.com
website: www.alconox.com

- Technical bulletins and MSDS
- Certificates of analysis
- Cleaning validation references
- US and international dealers
- Inhibitory residue test and CAP accreditation info

DETERGENT SELECTION GUIDE

Application Key Concerns	Articles Cleaned/ Soil Removed	Cleaning Method	Recommended 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	ALCONOX	LIQUINOX
		Machine washer, sani-sterilizer	ALCOJET	DETOJET
	Blood, body fluids, tissue on instruments.	Manual, Ultrasonic, Soak	TERGAZYME	
Pharmaceutical/Medical Device/Biotechnology Passing cleaning validation for FDA good manufacturing practices. For stainless steel, glass, plastic, elastomer cleaning.	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	ALCONOX	LIQUINOX
		Machine washer, power wash, CIP	ALCOJET TERGAJET (p-free)	SOLUJET
	Inorganic residues, salts, metallics, pigments. Eudragit* (E/RL/RS/E100) polymers, amphoterics, coatings, amines, ethers, starches, alkaloids.	Manual, Ultrasonic, Soak		CITRANOX
		Machine washer, power wash, CIP		CITRAJET
	Protein/ferment residues. R/O, U/F membranes.	Manual, Ultrasonic, Soak	TERGAZYME	SOLUJET
Laboratory/Environmental Reproducible results, no interfering residues, extending equipment life. Keep laboratory accreditation. Laboratory safety.	Glass, metal, plastic labware, ceramics, tissue culture, porcelain, clean rooms, animal cages, bioreactors, tubing, benches, safety equipment.	Manual, Ultrasonic, Soak	ALCONOX	LIQUINOX (p-free)
		Machine, power spray, labware washer, washer-sterilizer, cage-washers	ALCOJET	DETOJET
			TERGAJET (p-free)	SOLUJET (p-free)
	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	TERGAJET	LIQUINOX
		Machine washer, labware washer	TERGAJET	SOLUJET-base CITRAJET-acid
	Radioactive equipment/contaminants.	Manual, Ultrasonic, Soak	ALCONOX	LIQUINOX
	Stopcock grease.	Machine washer, warewasher	ALCOJET	SOLUJET
	Trace metals, metal oxides, scale, salts, starches, amines.	Manual, Ultrasonic, Soak		CITRANOX
		Machine washer, warewasher		CITRAJET
	Proteinaceous soils, bio-wastes, tissue, blood and other body fluids, fermentation residues.	Manual, Ultrasonic, Soak	TERGAZYME	
		Glassware washer	ALCOJET	SOLUJET
Metalworking/Precision Manufacturing/Optics Clean parts, avoid volatile solvents, strong acids, and other hazardous chemicals.	Glass, ceramic, porcelain, stainless steel, plastic, rubber. Oils, chemicals, particulates.	Manual, Ultrasonic, Soak	ALCONOX	LIQUINOX
		Machine washer, power wash	ALCOJET	DETOJET
			TERGAJET (p-free)	SOLUJET (p-free)
	Aluminum, brass, copper, and other soft metal parts. Oils, chemicals, particulates (acid for oxides, salts, buffing compounds).	Manual, Ultrasonic, Soak	ALCONOX TERGAJET (p-free)	LIQUINOX-base CITRANOX-acid
		Parts washer, power wash	ALCOJET TERGAJET (p-free)	SOLUJET-base CITRAJET-acid
	Inorganics, metallic complexes, trace metals and oxides, scale, salts, metal brightening.	Manual, Ultrasonic, Soak		CITRANOX
		Parts washer, power wash		CITRAJET
	Silicone oils, mold-release agents, buffing compounds.	Manual, Ultrasonic, Soak	ALCONOX	CITRANOX
		Parts washer, pressure spray	ALCOJET	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	ALCONOX	LIQUINOX
		Parts washers	ALCOJET	SOLUJET
Food and Dairy Avoid interfering residues on food-contact equipment.	Stainless steel, food-contact equipment.	Manual, Ultrasonic, Soak	ALCONOX	LIQUINOX
		Machine wash, pressure wash, CIP	ALCOJET	DETOJET
	Oxides, scale, trace metals, salts, milkstone.	Manual, Ultrasonic, Soak		CITRANOX
		Machine wash, pressure wash, CIP		CITRAJET
	Filter membranes. Proteins/biofouling.	Manual, Ultrasonic, Soak	TERGAZYME	
Cosmetics Avoid cross-contamination.	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
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.

Put us to the test

Alconox brings more than half a century of experience in developing cleaners for getting metals, glass, plastics, rubber, and ceramic critically clean.

Alconox anionic and nonionic cleaners come in liquid or powder form, for manual, machine, ultrasonic, soaking, or clean-in-place methods, with and without phosphates, in high and low pH, and with high or low foaming characteristics.

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When requesting samples, please use the detergent selection guide on page eight, our detergent selection system and sample request on our website at www.alconox.com, or contact the Alconox technical service department for help in selecting the best detergent samples for your application. Contact us at the address below for your free test samples and information packet.

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Please print, fill-out & return: fax +914-948-4088; or sbrown@alconox.com

1. ☐ **Please send me a copy of *The Aqueous Cleaning Handbook* and samples**
☐ **Please send me samples only based on the information provided below**

Note: To help us send the right samples for your application, please check all boxes that apply, or fill in where indicated.

2. What surfaces are you cleaning?
☐ 1. Polycarbonate, acrylic, and other sensitive plastics
☐ 2. Filters, membranes, RO or UF systems
☐ 3. PC boards, wafers, electronic components, etc.
☐ 4. Pipets in syphon washers
☐ 5. Soft metals: aluminum, copper, brass, other nonferrous
☐ 6. Stainless steel, iron, nickel, etc.
☐ 7. Glass, ceramic, porcelain, rubber, fiberglass, plastic
☐ 8. Other (Please Describe)_____

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 compounds, radioisotopes, radioactive contaminants
☐ 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 are you cleaning with your detergents?
☐ 1. Labware
☐ 2. Field Sampling Equipment _____
☐ 3. Other re-usable items/instruments _____
☐ 4. Filtration Membranes
☐ 5. Manufacturing equipment _____
☐ 6. Manufactured items _____
☐ 7. Other (Please specify) _____

5. How are you cleaning?
☐ 1. By hand
☐ 2. Soak or circulate clean-in-place
☐ 3. Syphon pipet washer
☐ 4. Spray, clean-in-place, or power spray wand
☐ 5. Ultrasonic (Brand)_____(Age/yrs) _____
☐ 6. Washer/sanitizer (Brand) _____(Age/yrs)_____
☐ 7. Glassware washer (Brand) _____(Age/yrs) _____
☐ 8. Parts washer (Brand)_____(Age/yrs) _____
☐ 9. PC board washer (Brand)_____(Age/yrs) _____
☐ 10. Other_____

5a. If machine, detergent used is ☐ Powder/paste ☐ Liquid* ☐ Acid Rinse?

***5b.** If liquid, are you willing to receive corrosive liquid samples ☐ Yes ☐ No

6. If you use cleaning machinery, are you planning to purchase new, upgrade, or replace it in the near future? ☐ Yes ☐ No

7. What size/how often do you purchase cleaners?
1. _____ units (single boxes or bottles) ☐ weekly ☐ monthly ☐ yearly
2. _____ cases (cases of boxes or bottles) ☐ 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 now measure cleanliness (beyond visual inspection)?
☐ Yes ☐ No
How? _____

10. If you are currently using a cleaner, what is it, and what problem(s) are you having, if any?

11. Any special waste treatment/disposal concerns?

12. Your company's principal activity:
☐ Healthcare
☐ Veterinary
☐ Pharmaceutical
☐ Tattoo
☐ Medical Device Mfg.
☐ Metalworking
☐ Laboratory
☐ Educational Inst.
☐ Household/Janitorial
☐ Water/Waste/Env. Lab
☐ Electronics
☐ Cosmetics
☐ Medical Device Reprocessing
☐ Nuclear
☐ Food & Dairy
☐ Optical
☐ Educational Inst.
☐ Sales Distribution
☐ Precision Mfg. (describe)_____
☐ Other (describe)_____

13. Your primary job function: (choose one)
☐ Administrative Assistant
☐ Consultant
☐ Corporate Management
☐ Engineer
☐ Healthcare
☐ Laboratory Manager
☐ Plant Manager
☐ Purchasing
☐ QC/QA Validation
☐ Safety/Regulatory Compliance
☐ Sales/Marketing/Distribution
☐ Scientist/Researcher/Teacher
☐ Stockroom/Store/Warehouse
☐ Technician
☐ Other:_____

14. I am asking for samples because of: (check all that apply)
☐ A need for better cleaning performance
☐ A need for more environmental cleaner
☐ A new cleaning application
☐ New cleaning equipment
☐ A need for a safer cleaner
☐ Recommendation
☐ Other:_____

15. If known, what detergent samples do you want?_____

COMMENTS:_____

Please print any name and address corrections below:

Name _____
Title _____
email _____ Phone _____
Company Name _____
Street _____
City _____ State _____ Zip _____ Country _____

Please print, fill out, and return by fax (++914-948-4088); scan and email sbrown@alconox.com; or visit www.alconox.com and "get sample."