

Surgical Instrument Cleaning Process

The Universal Processing Solution

The Surgical Instrument Enzyme Detergent Lubricant Cleaners

The Surgical Instrument Detergent Enzyme Lubricant Cleaner will **cut costs**.

The Surgical Instrument Detergent Enzyme Lubricant Cleaner will **clean fast**.

The Surgical Instrument Detergent Enzyme Lubricant Cleaner clean **residue free**.

The FOUR Enzyme Surgical Instrument Cleaning Detergent Lubricant

- is non irritating to the eyes nose and throat,
 - 100% biodegradable,
 - Neutral pH, and
 - delivers the 4 enzymes necessary to effectively breakdown and remove bioburden from eye surgical instruments. The Surgical instrument cleaners that do not contain these 4 enzyme detergents cannot remove all forms of proteinaceous bioburden. For the eye surgical instrument cleaning process to be thorough, 4 surgical instrument enzyme detergents are needed.
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- Lipase Surgical Instrument Enzyme Detergent for fat
 - Amylase Surgical Instrument Enzyme Detergent for starch
 - Carbohydrase Surgical Instrument Enzyme Detergent for high level starches and
 - Protease Surgical Instrument Enzyme Detergent for blood

The UPS-1 surgical instrument cleaning detergent enzyme lubricants break down all forms of proteinaceous bioburden from surgical instruments. The all-in-ONE surgical instrument cleaning detergent enzymes clean the surface of surgical instruments. The all-in-ONE surgical instrument cleaning detergent enzymes surfactants remove stains from surgical instruments. The all-in-ONE surgical instrument cleaning detergent enzymes enhance the passive layer of surgical instruments. The all-in-ONE surgical instrument cleaning detergent enzyme surfactants protect corrosive pitting of surgical instruments. The all-in-ONE surgical instrument cleaning detergent hard water conditioners provide spotless cleaning. The all-in-ONE surgical instrument cleaning detergent is the ONE Surgical Instrument Cleaner product for Surgical Instrument cleaning that is effective and fast. The all-in-ONE surgical instrument cleaning detergent enzymes prove effectiveness in ONE application for surgical instrument cleaning that is cost cutting and fast.

Surgical Instrument Cleaning Process

[John Temple](#)

Product Development

Simply stated, the UPS-1 surgical instrument cleaning detergent enzyme lubricants will:

- cut costs,
- clean faster,
- clean residue free,
- reduce shipping costs,
- replace multiple products, and
- improve the overall reprocessing of surgical instruments, scopes, and utensils.



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Eye Surgical Instrument Cleaning Process

Cleaning Eye Surgical Instruments

The product was originally developed for reprocessing eye surgical instruments.

- TASS, Toxic Anterior Segment Syndrome
- Cleaning Eye Surgical Instruments and rinsing clean.

A number of TASS cases have been the result of deficiencies in the methods used for cleaning eye surgical instruments and sterilizing the eye surgical instruments. Cleaning chemicals used during the cleaning process can be a factor in causing TASS if enough of the cleaning substance enters the eye. Eye Surgical Instrument Cleaners Detergents, enzymes, and residual metallic ions that are left on the eye surgical instruments as a result of inadequate cleaning and rinsing have been implicated. Eye Surgical Instrument Cleaners should be Neutral pH and free-rinsing to facilitate a residue free eye instrument surface. This can be instrumental in preventing TASS. In addition, heat-stable bacterial endotoxins in sterilizer reservoirs or water baths may contaminate instruments. Denatured viscoelastic materials trapped in eye surgical instruments and cannulas can also result in TASS. Redundant rinses during the cleaning of the eye surgical instruments can be instrumental in preventing TASS. When cleaning eye surgical instruments, multiple rinses can be an important to secure a residue free surface for preventing TASS. Properly flushing the lumens with large amounts of rinse water can be tedious and time consuming, but it is a critical step in preventing TASS. Automated Eye Surgical Instrument Washers secure the consistent delivery of the "Proper Sequence of Treatments" for cleaning eye surgical instruments.

The all-in-ONE Eye Surgical Instrument Cleaner

The cleaning and rinsing of eye surgical instruments for cataract surgery appears to be an important factor involved in many cases of TASS. For cleaning eye surgical instruments we can offer the following information. The all-in-ONE Eye Surgical Instrument Cleaner was originally formulated for the purpose of cleaning eye surgical instruments and is formulated as a highly effective, free-rinsing cleaner for all forms of bioburden, minerals deposits, and stains. Four enzyme Eye Surgical Instrument Cleaners are necessary to break down all forms of bioburden. Eye Surgical Instrument Cleaners that do not deliver Lipase, Amylase, Carbohydrase, and Protease Enzymes cannot remove all forms of eye surgical instrument bioburden. The all-in-ONE Eye Surgical Instrument Cleaner has been formulated with multiple enzymes within a non-foaming chemical complex to provide an ultra-clean, residue-free surface. The all-in-ONE is also available in the form of the easy-FOAM-it. The easy-FOAM-it dispenser creates a thick layer of foam on the surface of the eye surgical instrument. When water is added the foam dissipates. The initial foam is valuable for hydrating debris and to prevent encrustation on soiled eye surgical instruments but FOAMING DURING THE EYE SURGICAL INSTRUMENT CLEANING PROCESS IS DETRIMENTAL AS IT WILL INHIBIT PROPER CLEANING AND RINSING. This is especially important when using Ultrasonic Surgical Instrument Cleaners and Eye Surgical Instrument Washers. CLEANERS WITHOUT FOAM CONTROL require excessive rinsing. Excessive foam can cause unwanted residuals to be retained on the instrument surface. The all-in-ONE Eye Surgical Instrument Cleaner is free rinsing and renders a residue free surface. The all-in-ONE Eye Surgical Instrument Cleaner will exceed your expectations as a residue-free eye surgical instrument cleaner. We encourage you to evaluate the all-in-ONE Eye Surgical Instrument Cleaner. Your eye surgical instruments will look newer and perform longer. The all-in-ONE Eye Surgical Instrument Cleaner is designed to provide a residue free surface and for cleaning eye surgical instruments cleaner. The easy-FOAM-it Eye Surgical Instrument Pre wash Cleaner is Neutral pH and free rinsing for cleaning eye surgical instruments cleaner.

The all-in-ONE, 4 Enzyme Detergents (Lipase, Amylase, Carbohydrase, and Protease) break down all forms of bioburden and then rinses clean. Enzyme Detergent Cleaners that do not deliver these 4 enzymes cannot remove all forms of proteinaceous bioburden.

The all-in-ONE highly concentrated Enzyme Surgical Instrument Detergent Lubricant Cleaner delivers:

- Lipase Enzymes that breakdown fats, emulsified lipids, fatty acid residue, synthetic lipids, and petroleum jellies,
- Protease Enzymes that breakdown blood including the proteinases and peptidases to catalyze the hydrolytic breakdown of proteins,
- Amylase Enzymes that breakdown starches and catalyze the hydrolysis of starch into to sugars to produce carbohydrate derivatives,
- Carbohydrase Enzymes that breakdown starch to a lower level, to catalyze the hydrolysis of higher carbohydrates to lower forms.



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Surgical Instrument Cleaning Process

The all-in-ONE four Enzyme Surgical Instrument Detergent Lubricant Cleaner breaks down, dissolves, and removes bioburden to facilitate:

- cleaning the surface, the dissolving of mineral encrustation, removal of stains,
- exposure of the underlying bacteria to enable high-level disinfectants or liquid chemical sterilizing, and
- the lubrication and conditioning of the surface to enhance the passive layer that provides protection against corrosion, pitting and rust.

The all-in-ONE Enzyme Detergent Cleaner Lubricants are packaged as:

- UPS-23 easy-FOAM-it Pre wash Surgical Instrument Detergent Enzyme Lubricant Cleaners – 10 per case
- UPS-1 all-in-ONE Surgical Instrument Detergent Enzyme Lubricant Cleaners - 4 gallon jugs per case
- UPS-5 all-in-ONE Surgical Instrument Detergent Enzyme Lubricant Cleaners - 5 gallon
- UPS-15 all-in-ONE Surgical Instrument Detergent Enzyme Lubricant Cleaners - 15 gallon
- UPS-30 all-in-ONE Surgical Instrument Detergent Enzyme Lubricant Cleaners - 30 gallon
- UPS-55 all-in-ONE Surgical Instrument Detergent Enzyme Lubricant Cleaners - 55 gallon

SCROLL DOWN FOR INFORMATION PURSUANT TO THE TYPICAL APPLICATION OF EACH PRODUCT.

The all-in-ONE Surgical Instrument Detergent Enzyme Lubricant Cleaners deliver the four enzymes that are necessary for removing all forms of proteinaceous bioburden and the surfactant detergents to clean the surface after the enzymes break down the soil. Enzyme alone, do not clean. Detergents are necessary to clean the surface once the enzymes break down the soil. When you use the all-in-ONE, the enzymes and the detergents are working simultaneously to rapidly and effectively render clean medical devices.

The all-in-ONE and easy FOAM-it are highly concentrated and designed to be used for:

- pre wash soaking,
- hand washing,
- ultrasonic cleaners,
- scope cleaners, and
- automated surgical instrument washers and washer disinfectors.

The highly concentrated all-in-ONE Surgical Instrument Detergent Enzyme Lubricant Cleaners are aggressive against your most difficult cleaning challenge and guaranteed to be safe for: all type of metal, flexible and rigid scopes, stainless steel surgical instruments, tungsten carbide surgical instruments, aluminum, brass, plastic materials, delicate surgery micro surgical instruments, scope washers, ultrasonic cleaners, and surgical instrument washers.

The all-in-ONE Surgical Instrument Detergent Enzyme Lubricant Cleaners:

- significantly reduce the cost of enzymes, detergents, stain removers, and lubricating consumables,
- cut costs for freight and handling (due to high concentration) by an average of 400%,
- improve turnaround times for soaking, hand washing, and automated cleaning,
- decrease the inventory level, the number of products used, and the space expended for storing products,
- improve the overall condition, appearance and performance of surgical instruments and scopes, and
- combine the detergent and enzyme treatment cycles for ultrasonic cleaning, automated washers, and manual cleaning.

The all-in-ONE 4 Surgical Instrument Detergent Enzyme cleaners are:

- non-irritating to the eyes, nose, and throat,
- 100 % biodegradable,
- phosphate free, and
- neutral pH.

The all-in-ONE 4 Enzyme Detergents (Lipase, Amylase, Carbohydrase, and Protease) break down all forms of bioburden and then rinses clean. **Enzyme Detergent Cleaners that do not deliver these 4 enzymes cannot remove all forms of proteinaceous bioburden.** The all-in-ONE highly concentrated Enzyme Surgical Instrument Detergent Lubricant Cleaner delivers: Lipase Enzymes that breakdown fats,



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emulsified lipids, fatty acid residue, synthetic lipids, and petroleum jellies, Protease Enzymes that breakdown blood including the proteinases and peptidases to catalyze the hydrolytic breakdown of proteins, Amylase Enzymes that breakdown starches and catalyze the hydrolysis of starch into to sugars to produce carbohydrate derivatives, and Carbohydrase Enzymes that breakdown starch to a lower level, to catalyze the hydrolysis of higher carbohydrates to lower forms.

Surgical Instrument Cleaning Process

The UPS-23

The easy-FOAM-it Pre wash Surgical Instrument Detergent Lubricant Enzyme Cleaner is typically used as a pre wash cleaner for surgical instruments. Applied to soiled surgical instruments, the UPS-23 easy-FOAM-it Pre wash delivers a thick layer of FOAM with all of the Surgical Instrument Detergent Enzymes needed for residue free surgical instrument cleaning. The easy FOAM-it delivers the enzyme cleaners within a FOAM to avoid the respiratory irritations that have been associated with enzyme aerosols. The foam safely contains the enzymes and surfactant cleaners while delivering the most powerful cleaning concentrate.

The UPS-1

The all-in-ONE Surgical Instrument Detergent Enzyme Lubricant Cleaner, 4 gallon jugs with 1 pump, is typically used at a decontamination work sink, injecting 1 pump from the gallon jug of the all-in-ONE Surgical Instrument Detergent Enzyme Cleaner per gallon of water. The all-in-ONE Surgical Instrument Detergent Enzyme Cleaner is also used as an ultrasonic surgical instrument cleaner, injecting 1 pump of the all-in-ONE Surgical Instrument Detergent Enzyme Cleaner per gallon of water.

The UPS-5, 15, 30, and 55 gallon jugs are typically used with automated surgical instrument washers, washer disinfectors, and case cart washers. The jugs replace products used for: enzyme surgical instrument cleaners, detergent surgical instrument cleaners, (may include alkaline and neutralizer) and surgical instrument lubricants.

The all-in-ONE Surgical Instrument Detergents replace:

- surgical instrument detergent cleaning pre-wash products,
- enzyme surgical instrument cleaners,
- surgical instrument detergents,
- surgical instrument lubricants,
- ultrasonic surgical instrument cleaning solutions, and
- automated washer disinfectant detergents.

The all-in-ONE 4 Enzyme Detergent Surgical Instrument Lubricant Cleaners will:

- deliver the highest quality surgical instrument cleaning outcomes,
- reduce inventory costs for surgical instrument cleaning products,
- cut freight, handling and storage costs,
- boost surgical instrument cleaning throughput, and
- save surgical instrument cleaning time.

The all-in-ONE Surgical Instrument Detergent Lubricant Cleaner delivers a unique formulation of: detergents, multi-tiered high-level enzymes, and a neutral pH surfactant chemical complex. The four Enzyme Detergent Surgical Instrument Lubricant cleaner removes stains, protects the surface protection, and lubricates surgical instruments.

The four Enzyme Detergent Surgical Instrument Lubricant cleaner delivers Protease, Amylase, Lipase, and Carbohydrase enzymes that quickly remove the most stubborn organic encrustation and bioburden including: blood, fat, carbohydrates, starches, and protein. The four Enzyme Detergent Surgical Instrument Lubricant cleaner breaks down and removes bioburden, clean the surface, remove stains, and condition the surface to prevent staining and corrosion and pitting.



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The "free rinsing" The four Enzyme Detergent Surgical Instrument Lubricant cleaner conditions source water and counters the effects of hard water for spotless cleaning of Surgical Instruments. The all-in-ONE Surgical Instrument Detergent Enzymes remove stains. Surgical Instrument Cleaning Detergents with Enzymes prevent pitting. Surgical Instrument Detergent Enzymes can avoid corrosion. Detergent Enzymes will improve Surgical Instrument Washer performance.

Surgical Instrument Cleaning Process

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Product Development

The all-in-ONE Surgical Instrument Detergent Lubricant Cleaners deliver:

- highly concentrated surgical instrument cleaning detergents,
- four surgical instrument enzyme detergents necessary for removing bioburden,
- lubricants for surgical instrument moving parts, and
- surgical instrument surface conditioners to prevent corrosion.

Surgical Instrument Enzyme Cleaners Alone Do Not Clean

Enzymes alone do not clean surgical instruments. Surgical Instrument Detergents are necessary. Surgical Instrument Detergents are necessary to clean the surface of surgical instruments once enzymes have broken down bioburden. It is commonly stated that enzymes clean rapidly. Enzymes alone do not clean. The primary function of an enzyme surgical instrument detergent cleaner is to break down soil, usually proteinaceous bioburden. For a surgical instrument detergent cleaning product to "clean", surfactant detergents are necessary that will remove the soil from the surface of the surgical instruments. A combination of enzymes and detergents are necessary for optimal cleaning. Enzyme Detergent surgical instrument cleaners are often referred to as all-in-ONE surgical instrument detergent enzyme cleaners. The use of enzymes of various compositions and concentrations, in enzyme surgical instrument detergent cleaners is becoming common. Over half of all surgical instrument detergents presently available contain some level of enzyme detergent. If designed properly, surgical instrument detergent enzyme cleaners can: remove proteinaceous bioburden from surgical instruments, dissolve mineral encrustation from surgical instruments, remove stains from surgical instruments, and enhance the passive layer of the surgical instrument stainless steel and lubricate surgical instruments.

Endoscope Cleaning Sponges are available dry and preloaded with enzyme detergents. Surgical Instrument Cleaning Sponges are available dry and preloaded with enzyme detergents.

The Surgical Instrument Cleaning Process and Using Enzyme (Enzymatic) Products:

Common misunderstandings exist pertaining to the application of enzyme (enzymatic) detergents including the times and temperatures for optimal cleaning outcomes. Generalities can be misleading. For optimal outcomes there parameters, stated below, for the use of enzymatic enzyme detergents that can render a consistent high probability of excellent cleaning outcomes.

Enzyme Surgical Instrument Detergent Optimal Temperatures:

The optimal temperature for maximum enzymatic enzyme detergent cleaning performance peaks at 137 degrees Fahrenheit (137 degree Fahrenheit = 58.33 degree Celsius). The cleaning activity of the enzyme detergents at temperatures below and above this point is less but does offer cleaning value. The cleaning activity of the enzyme detergents does not stop at this temperature but is does lessen as the temperature increases.

The Surgical Instrument Cleaning Process and Dosage Rates

The optimal dosage rate (ounces diluted per carrier solution, usually neutral pH water) is a function of the types of enzymes and the concentration level of enzymes. The use of Enzyme Detergent Cleaners of various compositions and concentrations becoming common. Over half of all detergent cleaners available contain enzymes. The enzyme detergent cleaner industry is the largest single market for enzymes, at rate of 25 - 30% of total sales. Details of which enzymes are used within enzymatic enzyme detergent cleaners and the ways in which they are best used, are rarely been published.



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STUDY illustrating the EFFICACY of Surgical Instrument CLEANING.

Surgical Instruments that were cleaned in a Surgical Instrument Washer Disinfector using a combination four enzyme detergent lubricant cleaning concentrate:

"evaluation of Tunnel Washers with an Ultrasonic Surgical Instrument Cleaner confirmed that the efficacy of disinfection was 100%". "All surgical instruments and utensils tested were sterile at the completion of the process."

[John Temple](#)

John Prohonic

Product Development

Summary : Properly Designed Washer Decontaminators Washer Disinfectors are designed to clean all surfaces thoroughly, thereby providing the critical prerequisite for the safe handling, and to disinfect, and the sterilize surgical instruments.

Critical cleaners, usually referred to as Washer Decontaminators Washer Disinfectors, perform pre-wash, ultrasonic (optional), detergent washing, purified water elevated temperature rinsing, lubrication and high temperature drying in such a manner as to provide thoroughly clean, stain free and lubricated medical devices. Surgical Instruments cannot be sterilized (be sterile) unless all exposed surfaces are properly cleaned, prior to sterilization, to remove soil (debris, bioburden) and properly rinsed to prevent staining. 1,2,3 Not all Washer Decontaminators Washer Disinfectors provide adequate pre-rinsing, pre-cleaning, purified water rinsing, and thereby render higher rejection rates of processed surgical instruments. 4,5.

Proper Washer Decontaminator Washer Disinfector Design Secures Performance

The proper sequence of treatment and the correct choice of time, temperature and the components used are necessary to render surgical instruments that are critically clean, safe to handle, and have the prerequisite for sterilization. 6,7,8.

Washer Decontaminators Washer Disinfectors employ a cold water pre-wash to remove gross debris. This removes proteins and lipids, preventing them from being baked onto devices during the high temperature treatments to follow. 9, 10. Then, the ultrasonic process creates millions of micro implosions to loosen and free debris from lock boxes, hinge pins, serrations and other difficult-to-access surface areas.

The Washer Decontaminators Washer Disinfectors detergent wash then applies high flow low pressure water with a cleaning concentrate (at ~ 135 degrees F) in such a manner as to evenly reach all areas of the load and strip bioburden from the surgical instruments. The elevated temperature (at ~ 194 to 209 degrees F) purified water final rinse secures the biocidal process, removes mineral deposits from prior cycles and lubricates the instruments. The high temperature (at ~ 158 to 230 degrees F) dry cycle presents heated, forced air which dries each device. The critical cleaned medical devices are now clean, safe to handle, have the prerequisite for sterilization, and are properly prepared for further reprocessing.

Complete Removal of Pathogens

The Washington University School of Medicine at Washington University Medical Center examined the performance of a properly designed Washer Decontaminator Washer Disinfector (CESCO washer Decontaminator Model 520) and found that it removed all organisms from the surgical instruments tested. 11 The Washer Decontaminator Washer Disinfector was tested for its ability to completely remove pathological organism from surgical instruments. Pure cultures of the following organisms were grown on appropriate agar plates:

1. Staphylococcus aureus;
2. Pseudomonas aerations;



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3. Escherichia coli;
4. Bacillus species

Kelly clamps, tweezers and scissors were placed on these plates of organism, taking care to ensure that all serrated edges were packed with all the organisms. Each contaminated instrument was then dipped into the tube of Thioglycolate medium before being placed in all the washer baskets. The instruments were then processed through the complete Washer Decontaminator Washer Disinfector cycle. At the end of the drying cycle, the instruments were allowed to cool and then dipped into another tube of Thioglycolate medium.

Results: All tubes of the Thioglycolate medium tested before the wash grew the appropriate organism within six to 18 hours after testing. All tubes tested at the end of the wash showed no growth after 14 days of incubation. This Washer Decontaminator Washer Disinfector removed all organisms from the instruments.

Washer Decontaminator Washer Disinfector Efficacy of Disinfection 100%

Another evaluation of Washer Decontaminators Washer Disinfectors confirmed that the efficacy of disinfection was 100%. In this study, L.P. Jette and N.G. Lambert used two test methods.¹² One method (N) was to test the effect of heat only within the disinfection process and the other test method (G) was to test the efficacy of both heat and washing. Each method gave reproducible results and confirmed the efficacy of the Washer Decontaminator Washer Disinfector. Washer Decontaminator Washer Disinfector Critical cleaners demonstrated the ability to completely remove pathological organisms with effective repeatability. There operation is automatic, reliable, labor saving and easy to use. Central Processing departments rarely find the need to manually treat devices and report an exceptionally low rate of rejected devices. Conclusion: The Washer Decontaminator Washer Disinfector sequence, cold water pre-wash, ultrasonic cleaning, detergent washing action, final rinse and drying treatment of a properly designed Washer Decontaminator Washer Disinfector Critical Cleaner will provide critical cleaning, the prerequisite for safe handling, optimal disinfecting, and sterilizing of medical devices.

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John Temple CESCO, Vice President, Director of Product Development

John Prohonic CESCO, Director of Engineering

The Surgical Instrument Cleaning Process

STUDY illustrating the EFFICACY of Surgical Instrument CLEANING. After surgical instruments and utensils were cleaned in an instrument washer disinfector using an enzyme detergent concentrate: All surgical instruments and utensils tested were sterile at the completion of the process.



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Validation of the microbial safety of surgical instruments and utensils following automated cleaning by a Washer Decontaminator Washer Disinfector for Thermal Disinfection.

The application of universal precautions to instruments/utensils handling became an issue in the selection of replacement decontamination equipment for Central Sterile supply at our hospital. The new technology of an automated thermal disinfection Washer Decontaminator Washer Disinfector (TW)(CESCO TM, Mercersburg, Pa.) offered increased protection to our reprocessing staff due to decreased handling but raised concerns about the efficacy of thermal disinfection as opposed to traditional washer sterilization. Because of the limited scientific documentation of this new technology, a study was undertaken to establish the microbial safety of finished products and to identify any feature or function failure which could adversely affect outcome. The sequential functions of the Washer Decontaminator Washer Disinfector progress from flush/rinse, sonic bath, wash, rinse, lubricant/deionized water (DI) sprays to drying at 240° F. for 4 minutes. The Washer Decontaminator Washer Disinfector was challenged with selected instruments and utensils that are considered to be very difficult to clean. Included were 30 each of stainless steel non-perforating towel clips and stainless steel and glass medicine cups. Each item was rinsed with a 10 5ml suspension of Staphylococcus aureus, Pseudomonas aeruginosa, Enterococcus faecalis and Candida albicans in nutrient media and then dried. The instruments were processed in the Washer Decontaminator Washer Disinfector 3 separate loads during times of high volume operation. All products were tested for sterility. Ten separate cultures were taken of the final rinse solution of instrument lubricant and de-ionized water prior to the drying cycle. A separate culture was taken of the instrument lubricant fluid. All instruments and utensils tested were sterile at the completion of the process. The final rinse, however, was heavily contaminated with the saprophytic bacteria Flavobacterium sp., Pseudomonas (P.) picketti and P. rubrisubalbicans. The source of the contamination was determined to be resin gel in the DI tank and not the instrument lubricant. The contamination can be eliminated by the addition of a 0.22 u filter to the DI line. Our findings support the practice of validating all features of new technologies that may compromise the expected final outcome. The Washer Decontaminator Washer Disinfector is a valid replacement for the conventional washer-sterilizer.

Ann Drake, Ohio State University Medical Center, Director of Central Processing, President of APIC
John Temple CESCO, Vice President, Director of Product Development

NOTE: Surgical Instrument Washers (Tunnel Washers with an automated Ultrasonic Surgical instrument Cleaner used in this research study were manufactured by CESCO, Mercersburg PA. Although these Surgical Instrument Washers Tunnel Washers are not currently available from CESCO. The studies demonstrate the propensity for Surgical Instrument Decontamination Washer Disinfectors to deliver optimal cleaning results. The surgical instrument cleaners used in this study are currently available in the form of the all-in-ONE four enzyme surgical instrument detergent lubricating cleaners.

Simply stated, the UPS-1 surgical instrument cleaning detergent enzyme lubricants will:

- cut costs,
- clean faster,
- clean residue free,
- reduce shipping costs,
- replace multiple products, and
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