

SilvaClean® Antimicrobial Laundry Additive

Laundry Process and Facilities Frequently Asked Questions

Q. What is SilvaClean®?

A. SilvaClean is an innovative, new laundry additive for reducing post-laundry contamination. SilvaClean® is effective in inhibiting the growth of bacteria, mold and mildew in products to which it is applied. SilvaClean will kill 99.9% of *Staphylococcus aureus* after 6 hours of contact and 99.9% of *Klebsiella pneumoniae* after 3 hours of contact with SilvaClean treated fabric.

2. What is the SilvaClean system?

The SilvaClean system gets installed at the laundry facility to deliver SilvaClean laundry additive to the laundry machine.

The SilvaClean system (as show in the figure below) consists of:

- **Cartridge:** The SilvaClean cartridge contains the SilvaClean chemistry solution. Each cartridge can treat approximately 200,000 pounds of textiles.
- **Dispensing device:** SC4700 industrial laundry dosing unit which delivers SilvaClean chemistry to the washer. The SC4700 unit is connected to the laundry machine.
- **Remote cloud monitoring system:** The remote monitoring feature allows for system control, remote data collection, and sends alerts to Applied Silver Inc. (ASI) to ensure overall quality control of the process. This also allows detailed production reports to be supplied to customers.



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The SC4700 directly delivers SilvaClean chemistry into the final rinse of the laundry cycle. The silver ions from the SilvaClean solution attach to the textiles and stay on the textiles providing to provide an ongoing antimicrobial effect after the textiles are dried, throughout storage, transport and during use.

Q. What textiles can be treated with the SilvaClean chemistry?

A. When in use, SilvaClean on textiles made of cotton, cotton/polyester blend, and microfiber (Examples include: pillow covers; sheets; blankets; bedspreads; apparel; uniforms, mops, cloths, towels) has residual activity against *Staphylococcus aureus* after 6 hours of contact and *Klebsiella pneumoniae* after 3 hours of contact. SilvaClean can also be used for material preservation of textiles made of: cotton and cotton/polyester blend, polyester, nylon, microfiber, spandex, and nylon/spandex blend (Example items include: pillow covers; sheets; blankets; bedspreads; apparel; uniforms; jerseys; active wear; scrubs; lab coats; quilts; liners; curtains; draperies; upholstery; towels; shower curtains; and carpets.).

Q. What are the site requirements for installing an SC4700 in a laundry plant?

A. The SC4700 requires 4 things:

- 1) Dedicated water supply. (Continuous pressure above 20 psi is recommended).
- 2) Dedicated power supply at 120 volts and below 15 amps
- 3) Ethernet connection
- 4) Access to a drain

ASI can provide a deionized water filtration system as part of the installation when an existing system is not present to supply water to the SC4700.

Q. How long does the installation process take?

A. Following a purchase order, a typical installation requires:

- 1) A preliminary questionnaire to gather site information (see Appendix)
- 2) An onsite visit to meet with site engineer/manager and chemicals provider (if necessary) to gather additional requirements and scope the site (1 day).
- 3) An onsite installation visit to physically install the system that typically takes 4-7 days and includes:
 - a. Plumbing, mechanical, and electronic integration into tunnel washer, incorporation of SilvaClean chemistry recipes into tunnel recipe list
 - b. Line verification and qualification
 - c. Site personnel will be trained to handle SilvaClean cartridges as part of the basic training given by the ASI technical support staff.

All steps require ASI technical support staff to work directly with site engineers and other relevant personnel to ensure a successful integration of the SilvaClean system into your laundry process.

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Q. How much space is required to install the SilvaClean SC4700 System?

A. The SC4700 unit is 27" by 14.5" by 52". ASI recommends a 9-square foot footprint to allow enough space for the doors to open. If the facility already has a deionized water filtration system, an additional installation is not required. When installed, an additional 72" by 18" footprint will be required, but this space does not need to be directly next to the SC4700.

Q. Is the SilvaClean system fully automated?

A. Once installed and qualified, the SC4700 is fully automated only requiring replacement of a concentrate cartridge, approximately every 200,000 pounds of treated textiles.

Q. How will installing SilvaClean system impact the existing laundry process at the facility?

A. Once installed, the SilvaClean system is specifically designed to have minimal impact to your current laundry process. Once the new, SilvaClean recipes or formulas have been programmed into the washing machine, initiation to treatment simply requires selection of the right recipe, with the rest of the workflow remaining the same. ASI technical support staff will provide best practices and new recipes that have minimal disruption to the laundries routine process. If your laundry requires segregation of SilvaClean treated textiles from untreated textiles as part of the workflow, ASI technical support can provide consultation and share best practices.

Q. Can SilvaClean treatment be turned on or off as needed?

A. SilvaClean treatment can be easily turned on or off using the enable/disable switch. This allows laundries to turn the service on for clients that request SilvaClean treatment of their textiles.

Q. When should the SilvaClean cartridge be replaced?

A. The SilvaClean cartridge is to be replaced approximately every 200,000 pounds of laundry treated. The remote alert light and the SC4700 status indicator light will notify laundry staff when the cartridge is low and ready to be replaced as well as when it is empty.

Q. Does SilvaClean treatment replace existing laundry process?

A. SilvaClean treatment augments existing laundry processes to provide a new standard of textile care for patients and clinicians with active antimicrobial properties effective anytime a microbe touches the textile: in storage, during handling and in use.

Q. Will the silver in SilvaClean chemistry interact with other laundry chemicals?

A. Since SilvaClean chemistry is only added in the final rinse of the laundry process, it minimally interacts with other laundry chemicals directly. However, it is compatible with current laundry processes and chemistries including detergents, sours, softeners, etc.

Q. Does water quality impact SilvaClean treatment?

A. SilvaClean antimicrobial technology is designed for industrial water (i.e. softened water) but works efficiently with varying water profiles.

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Q. In a counter flow tunnel washer does SilvaClean chemistry travel with the water cycle back to the front?

A. Because silver ions are efficient in attaching to textiles through a +/- charge interaction, negligible amounts of silver will be in the effluent and move through a tunnel with reused wash water.

Q. Does silver attach to or plate onto equipment?

A. Because the ionic form of silver is deployed into the laundry equipment, SilvaClean chemistry does not attach to any equipment that is properly maintained and run within manufacturer specifications.

Q. What about silver discharge?

A. The SilvaClean product is registered for use as a laundry additive by the Federal EPA and the California Department of Pesticide Registration for industrial use. SilvaClean has been intensively tested for concentration of silver in effluents as part of that approval process. Any residual silver ions in the waste water are at levels significantly below the EPA's and the city Publicly Owned Treatment Works (POTW) requirements.

Q. How does silver attach to fabrics?

A. Silver ions are positively charged and form a strong bond with all textiles as they have a slight negative charge. Once attached, the silver ions create a lasting antimicrobial effect on the textiles.

Q. Does SilvaClean treatment change the way fabrics looks, feels, smells, etc.?

A. No. SilvaClean treatment does not change the way the fabric looks or feels. Silver ions are much smaller than the eye can see and cannot be seen on textiles and do not result in any discoloration of the treated textile.

Q. Are there any OSHA implications for SilvaClean product use? Is the product safe to use?

A. SilvaClean handling practices are simple and comparable to other laundry chemicals used in the existing industrial process. In fact, SilvaClean concentrate falls into the same category as most concentrated laundry soaps, sharing the same hazmat packaging group (II), corrosive rating (II), and UN identification number (1760). Employees handling SilvaClean should consult the cartridge label for safety information and handling instructions. Site personnel will be trained to handle SilvaClean cartridges as part of the basic training given by the ASI technical support staff. SilvaClean uses silver ions. At the concentrations used in the product, it is a potent antimicrobial and does not impact mammalian cells, including human cells. It is safe to use and is approved by the EPA to be used for industrial use including use in all hospitals including neonatal, pediatric, PICUs etc. SilvaClean has been in use at multiple hospital and sports facilities for the last several years.

Q. How can SilvaClean treatment of textiles be verified?

A. SilvaClean treatment of textiles can be easily verified using a simple colorimetric SilvaSure® test kit.

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Q. What is the SilvaSure® kit?

A. The SilvaSure kit is a simple colorimetric test to confirm presence of silver ions on linens following SilvaClean treatment. The test can be used for quality control of process and requires minimum training to use.



Q. How is SilvaClean product registered and/or approved for use by the government?

A. SilvaClean is an antimicrobial laundry additive that reduces post-laundry contamination. SilvaClean product registration falls under the regulatory authority of the Environmental Protection Agency (EPA), specifically, the Antimicrobials Division (7510P) under the Office of Pesticide Programs (OPP). EPA regulates pesticides under the statutory authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), which defines an Antimicrobial pesticide as that which is intended to disinfect, sanitize, reduce, or mitigate growth of development of microorganisms; or protect inanimate objects from contamination caused by microorganisms. Read more at the EPA website here: <https://www.epa.gov/pesticides/antimicrobial-pesticides>

Q. How do treated sheets benefit laundry employees?

A. While SilvaClean antimicrobial textile treatment has benefits to the end-user, it also provides a significant benefit in improving the laundry employee experience as linens leaving the laundry and returning after use to the laundry are continually killing odor and stain causing bacteria, mold and mildew thus reducing employee exposure to microbes coming from client facilities.

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Q. Is SilvaClean registered with the EPA for public health uses?

A. Yes. Under the product registration “Laundry additive to reduce post-laundry contamination”, the EPA has approved SilvaClean for public health uses. SilvaClean can be recommended as a useful addition to aid Infection Control at hospitals and sports programs. It kills 99.9% of *Staphylococcus aureus* after 6 hours of contact and *Klebsiella pneumoniae* after 3 hours of contact. See approved EPA label on the EPA’s Website: https://www3.epa.gov/pesticides/chem_search/ppls/090335-00001-20180425.pdf

Q. Is SilvaClean registered with the EPA for non-public health uses?

A. Yes. Under the product registration “treated article exemption”, the EPA has approved SilvaClean for use in protection of treated textiles from stain- and odor- causing bacteria mold and mildew. See approved EPA label on the EPA’s Website: https://www3.epa.gov/pesticides/chem_search/ppls/090335-00001-20180425.pdf

Q. What is the difference between SilvaClean technology and other Bactericides and Fungicides?

A. Unlike chlorine, quaternary ammonium compounds (quats.) and peroxide additives, the SilvaClean, when treated onto fabrics, is effective when the fabrics are used. SilvaClean remaining in linens will reduce levels of *Staphylococcus aureus* by 99.9 % after 6 hours of contact and *Klebsiella pneumoniae* by 99.9% after 3 hours of contact. A. It is widely accepted that textiles are fomites capable of harboring microorganisms for extended periods of time. This occurrence results in two potential outcomes:

- a. Spread of microorganisms from this source to other surfaces. In the hospital setting, these microorganisms, when pathogenic or infectious in nature, can potentially cause Healthcare Associated Infections (HAIs). When SilvaClean is introduced as a component of an Infection Control bundle, it can aid in control environmental sources of microbial contamination. A study done by Openshaw et. al. and published in the American Journal of Infection Control demonstrates that treated hospital linens had a lower microbial load (including lower loads of *Staphylococcus aureus* and MRSA). Additionally, Applied Silver has also published a clinical surveillance study done at three hospitals where an Infection Control bundle, of which SilvaClean was a part of, resulted in a 43% reduction in HAI rates over the period of the study.
- b. Deterioration of fabric over time due to metabolic activities of the microorganisms. SilvaClean reduces the amount of stain- and odor-causing bacteria, mold and mildew on the fabrics, protecting them and extending the life of use.

Q. What are the potential environmental impacts of SilvaClean treatment?

A. The SilvaClean product is registered for use as a laundry additive by the Federal EPA and the California Department of Pesticide Registration for industrial use. SilvaClean has been intensively tested for concentration of silver in effluents as part of that approval process. Any residual silver ions in the waste water are at levels significantly below the EPA’s and the city Publicly Owned Treatment Works (POTW) requirements.