

Milliken®

AlphaSan®

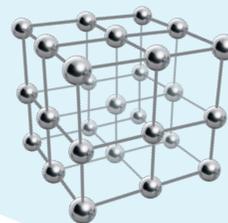
Silver Ion Based Antimicrobial



Milliken™

What is AlphaSan?

AlphaSan is a **silver ion** based additive for textiles that reduces offensive odors by eliminating odor causing bacteria. AlphaSan is an unreactive, cube-shaped ceramic matrix that holds silver ions until conditions (such as exposure to sweat) releases them. AlphaSan is blended and evenly distributed into the individual textile fibers used to construct apparel.



AlphaSan neither contains nor is composed of silver nanoparticles.

What's the difference between nanoparticles of silver metal and silver ions?

Silver nanoparticles are extremely small pieces of silver metal. Silver metal is unreactive and does not kill bacteria.

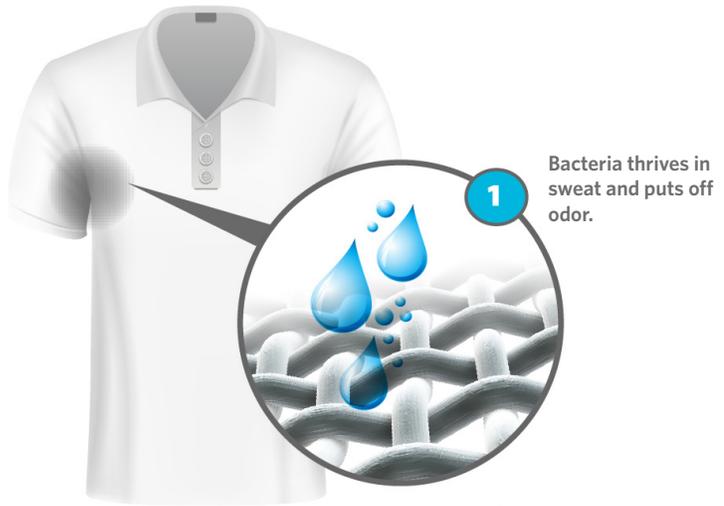
A Silver ion is an individual atom of silver that is missing an electron. The silver ion will therefore react quickly with molecules found inside the bacteria cells or the chlorine ions (Cl⁻) in sweat.

How does AlphaSan work in fabrics?

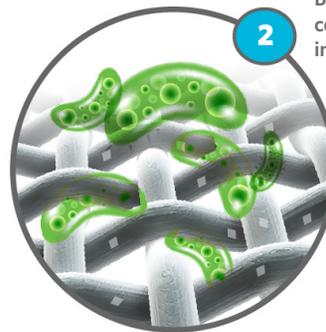
When we sweat, our bodies saturate our clothing with perspiration creating an ideal environment for bacteria. As bacteria eat and grow, they generate malodor via off-gassing. AlphaSan specifically works with our perspiration to eliminate the bacteria.

Perspiration is mostly composed of water and trace amounts of salt. Salt is composed of Sodium ions (Na^+) and Chlorine ions (Cl^-). When AlphaSan is exposed to Sodium (Na), the Sodium ion (Na^+) switches places with the Silver ions (Ag^+) in the AlphaSan cube. The Silver ion (Ag^+) is absorbed through the bacteria cell wall to disrupt the bacteria's ability to survive. By eliminating the bacteria, the source of malodor (bacteria off-gassing) is eliminated as well.

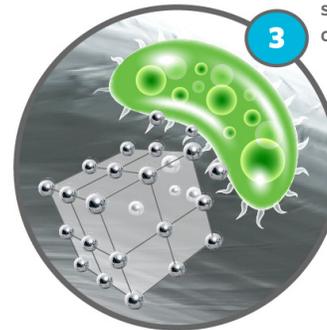
AlphaSan works in many types of fabrics including medical wound dressings. Open wounds from burns or lacerations are an ideal environment for bacteria. AlphaSan's Silver ions (Ag^+) inhibit infection-causing microbial growth.



Bacteria thrives in sweat and puts off odor.



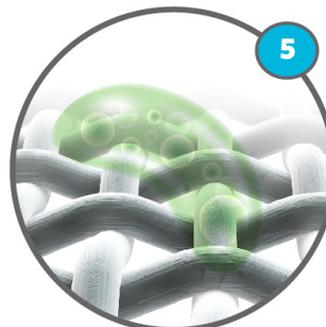
Bacteria comes in contact with AlphaSan impregnated fiber.



AlphaSan releases silver ions in presence of perspiration.



Silver ions absorbed by bacteria.



Bacteria life cycle terminated.

What happens to the silver ions that touch my skin from AlphaSan?

Silver ions do not remain ions very long because they quickly react with other ions. The Silver ion (Ag^+) reacts quickly to and binds strongly with an ion that has an extra electron - like the Chlorine ion (which is found in sweat) or protein ionic species (found inside bacteria).

Do silver ions in AlphaSan washout during laundering?

No, AlphaSan particles do not wash off or out of fibers during normal laundering. The water and detergents used during laundry care do not contain the sodium ions (Na^+) required to replace the silver ion in AlphaSan. The silver ion therefore remains intact within the AlphaSan cube matrix.

Do silver ions in AlphaSan migrate out of a textile?

The silver ions in AlphaSan must have Sodium ions (Na^+) or other highly reactive ions plus water to release the Silver ions (Ag^+).

How long will AlphaSan work in a garment?

Testing finds AlphaSan to maintain performance through many wash cycles (50 to 100 washes). The silver ions in AlphaSan remain trapped in the cube (matrix) until Sodium ions (Na^+) replace them. Over time, the silver ions (Ag^+) deplete when exposed to sweat. However, as a garment is laundered, more AlphaSan cubes become exposed due to friction on the fiber surface. This exposes more of the AlphaSan cubes and allows for a fresh supply of Silver ions (Ag^+).





Silver is safe for human contact and has been used for thousands of years in numerous applications. These include cutlery, coins, jewelry, electronics, RFID devices and even to preserve water and wine.

Where is AlphaSan used today?

Medical: AlphaSan is commonly used in the US and Europe in wound care dressings for burns, diabetic foot ulcers, skin grafts, and other open wounds. The Silver ions (Ag⁺) inhibit microbial growth.

Appliances: AlphaSan is also used in a variety of appliances including refrigerators and ice machines. AlphaSan is impregnated into plastic housings, hoses and other parts to prevent buildup of biofilms.

Textiles: AlphaSan is used in a variety of apparel items ranging from socks, shirts, undergarments, gloves, and athletic gear where perspiration and malodor is common.



AlphaSan Silver Ion Based Antimicrobial

Milliken®
AlphaSan®
Silver Ion Based Antimicrobial

About Milliken

Milliken is an innovation company that has been exploring, discovering, and creating ways to enhance people's lives since 1865. Working from our laboratories, application and development centers around the world, our scientists and engineers create coatings, specialty chemicals, and advanced additive and colorant technologies that transform the way we experience products from automotive plastics to children's art supplies. With expertise across a breadth of disciplines that also includes floor covering and performance materials, the people of Milliken work every day to add true value to people's lives, improve health and safety, and make this world more sustainable.

chemical.milliken.com

PLEASE NOTE: As each customer's use of our product may be different, information we provide, including without limitation, recommendations, test results, samples, care/labeling/processing instructions or marketing advice, is provided in good faith but without warranty and without accepting any responsibility/liability. Each customer must test and be responsible for its own specific use, further processing, labeling, marketing, etc. All sales are exclusively subject to our standard terms of sale posted at www.milliken.com/terms (all additional/different terms are rejected) unless explicitly agreed otherwise in a signed writing.

© Copyright 2021 Milliken & Company. All rights reserved.
AlphaSan® and Milliken® are registered trademarks of Milliken & Company.
07.01.2021

NORTH AMERICA
Spartanburg, SC, USA
P. 1.800.910.5592
F. 864.503.2430
millichem@milliken.com

EUROPE
Gent, Belgium
P. 32.9.265.1100
F. 32.9.265.1195
eurochem@milliken.com

LATIN AMERICA
Sao Paulo, Brazil
P. 55.11.3043.7942
F. 55.11.3043.7096
lachem@milliken.com

Mexico City, Mexico
P. 52.55.3088.3600
F. 52.55.9000.2643
lachem@milliken.com

ASIA
Singapore
P. 65.6377.0770
F. 65.6377.0990
asiachem@milliken.com

Shanghai, China
P. 86.21.6145.5555
F. 86.21.6145.5558
asiachem@milliken.com

Pune, India
P. 91.20.6730.7501
F. 91.20.6730.7514
asiachem@milliken.com

The Milliken logo is a stylized, handwritten-style script in blue, with a small trademark symbol (TM) at the end.