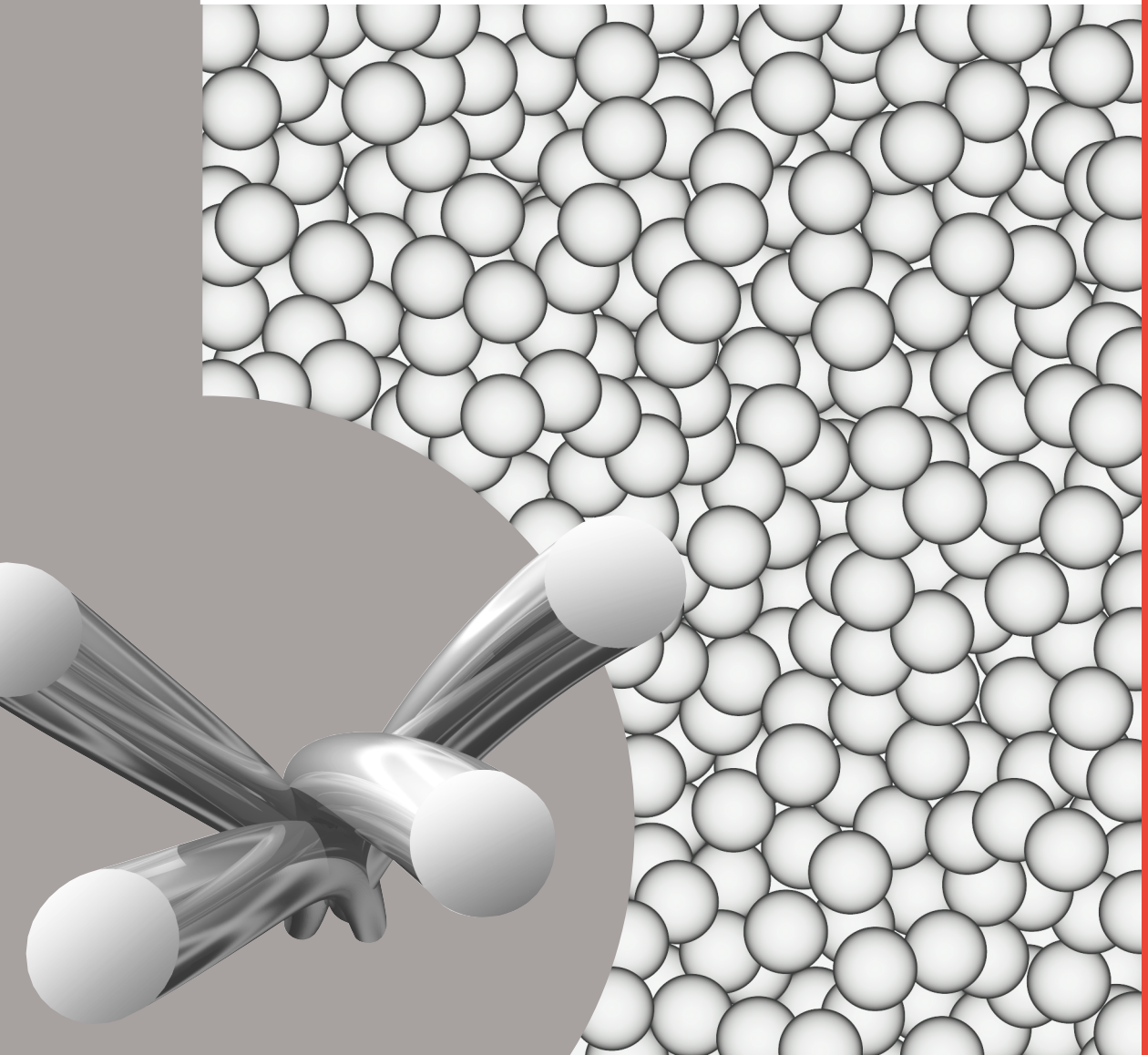


x-static®

THE SILVER FIBER™



“if it says **x-static®**, you will be!”



THE X-STATIC®/SILVER STORY

The use of silver for its medical and therapeutic benefits dates back thousands of years. In fact, the Romans were the first to publish and document the "magical healing" powers of silver when used to cover wounds. Further, Cyrus the Great, in the 5th century BC, would only let his troops go to war if they carried water in silver vessels—something he knew would keep the water supply clean and safe. It is somewhat humbling to know that a Persian King touted the benefits of the active ingredient used in X-Static®.

Roman intuition proved to be correct. Modern Western medicine recognizes silver as the most effective antimicrobial agent, natural or otherwise. At the turn of the century, silver was actually considered the first antibiotic—silver foil was used as a wound dressing. Today, silver is used for its broad-spectrum antimicrobial properties in healthcare products ranging from bandages to burn care treatments to catheters—almost any product where infection control is critical. The majority of Americans are first exposed to silver at birth, when silver nitrate eye drops are used to prevent infection. Silver is also widely used for industrial applications, most notably in drinking water filters and swimming pool filtration systems.

X-Static® - The Silver Fiber™

X-Static - The Silver Fiber, has a layer of pure silver permanently bonded to the surface of a textile fiber. The process is such that the fiber, with its silver layer, retains traditional textile and tactile characteristics. It can be used in knits, wovens and non-wovens as either a filament or spun yarn. X-Static offers all of the benefits known to be inherent to pure silver, only in a new format—a textile fiber.

X-Static has been used primarily as an industrial and medical product for the last decade, servicing high-tech industries and the Department of Defense. More recently, however, X-Static has been thrust into consumer product markets as a result of the need for a safe and effective antimicrobial solution. X-Static is the best antimicrobial solution on the market, yet it is a fiber system that is uniquely suited to meet several additional market demands:

1. *Antimicrobial*: Eliminates odor-causing bacteria and athlete's foot fungus.
2. *All Natural*: Safe and non-toxic, containing no chemicals or pesticides.
3. *Heat Transfer*: Cooler in the summer, warmer in the winter.
4. *Anti-static*.
5. *Therapeutic*: With its conductive properties (silver is the most conductive metal), the fiber system has many health benefits.

X-Static has been researched and tested by leading institutions around the world and is widely accepted in the medical community. X-Static is used in many FDA approved products and is also registered as an antimicrobial with the EPA. The X-Static brand is growing rapidly in the worldwide consumer marketplace and X-Static products have won prestigious awards for outstanding performance and function.

ANTIMICROBIAL PERFORMANCE

The antimicrobial performance of X-Static has been validated by prestigious institutions throughout the world. In addition to independent laboratory and field tests, X-Static was the focus of numerous medical abstracts published over the past several years. A synopsis of these studies has been included in this document—all show that X-Static provides unparalleled antibacterial performance. Several studies prove that when someone wears an X-Static product, the fiber is so effective that sweat actually becomes antimicrobial. When you compare X-Static to other antimicrobial products, there are several distinct performance advantages:

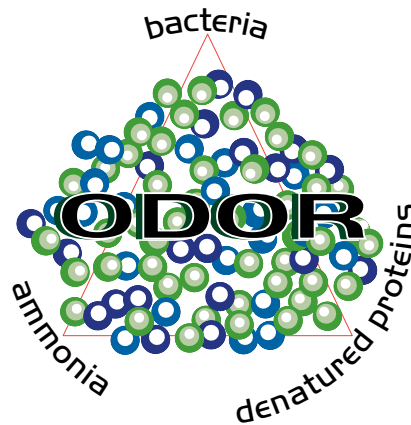
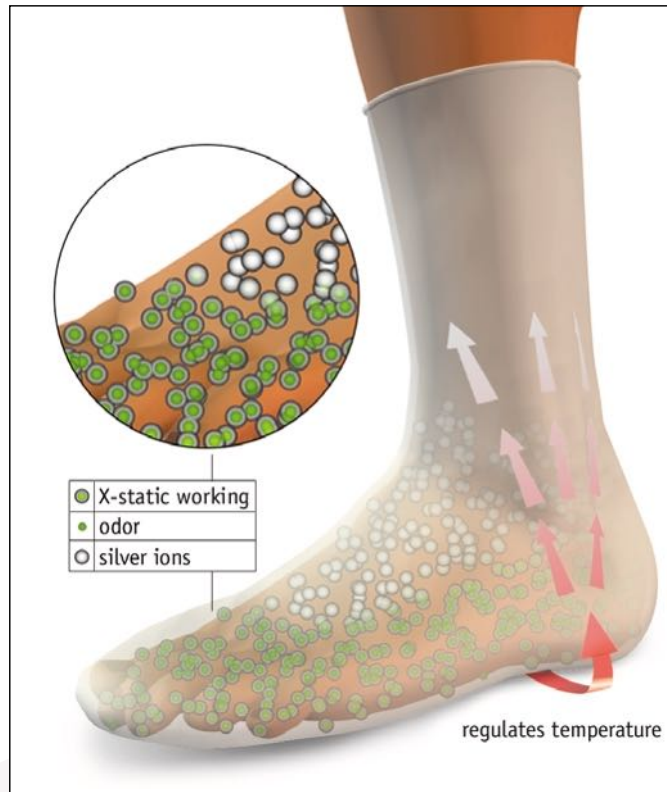
- *Speed:* X-Static eliminates 99.9% of bacteria in less than one hour of exposure. (Most antimicrobial products test over 48 hours and still do not reach this level of effectiveness.)
- *Catalysts:* The hotter and wetter the environment, the more effective X-Static becomes. This is perfect, because bacteria are more prevalent in these environments.
- *Safe & Natural:* X-Static is made with pure silver, a naturally occurring element. There are no chemicals and there is no fear of toxicity for the consumer. Silver is one of the safest and most benign substances to mammals. (The use of chemical antimicrobial products has been clouded by fears of harmful side effects.)
- *Permanent:* X-Static is not a surface treatment. Silver is irreversibly bound to a polymer so it becomes a physical part of the fiber. X-Static is permanent and performance does not diminish over time. In fact, X-Static has been tested for more than 250 washes with virtually no reduction in antibacterial performance.

Anti-odor Performance

Antimicrobial is not always synonymous with anti-odor. X-Static offers both antimicrobial and anti-odor performance.

Bacteria are only one cause of body odor. Ammonia and denatured proteins are also significant contributors to odor in apparel and hosiery products. Incredibly, both ammonia and denatured proteins bind most readily to silver. Because silver is on the outside of the fiber, X-Static allows for immediate binding with ammonia and denatured proteins—resulting in instant odor reduction.

ANTI-ODOR

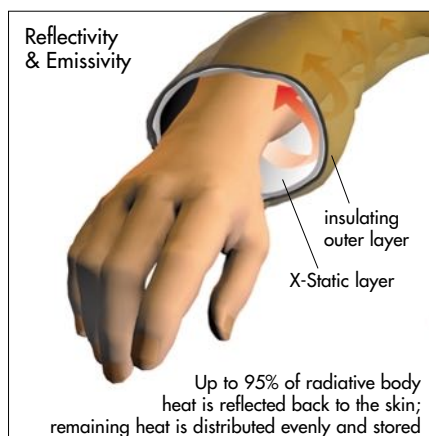


HEAT TRANSFER

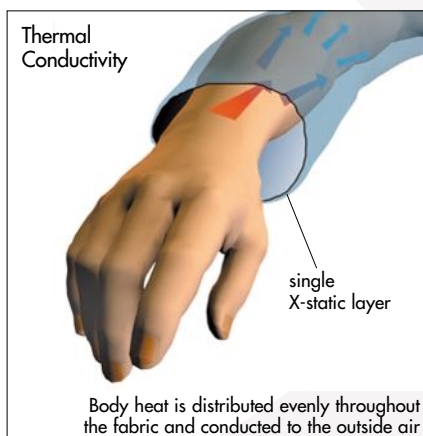
The biophysics of clothing has become an area of significant interest in recent years. It represents the marriage of physiology, physics, textile science and clothing design. The specific area of thermal performance has been the primary focus of this burgeoning area of study. Given the proper materials and constructions, it is now possible to use the existing energy of the body and the environment to actively regulate temperature through heat transfer. Because of the inherent properties of silver, X-Static is perfectly suited to this task.

Body heat is transferred by four basic mechanisms:

1. **Radiation:** the primary heat transfer mechanism in *cold weather*, contributing to approximately 90% of body heat loss. (In warm weather, heat loss due to radiation will be very low or none.) In order to increase body temperature in cold weather, it is critical to actively use the radiative energy generated by the body. The most efficient means of using this energy is to reflect it back to its source and/or to store it.
2. **Conduction:** the primary heat transfer mechanism in *warm weather* (because radiation contributes to little or no heat transfer). In order to transfer heat and reduce body temperature, it is necessary to actively move, or conduct, heat from the skin to the outside environment.
3. **Evaporation:** the change of a liquid into a gas. When the body can't dissipate enough heat through conduction or convection, it will use evaporation, the result of which is sweat. Evaporation is active in *warm and cold weather*, depending on activity levels. In order to remain comfortable, the moisture generated by the body must be transported efficiently away from the skin.
4. **Convection:** the movement of heat between a solid and a liquid or gas. Convection is noticeable in *cold and warm weather*. For example, wind will cool your skin, making you more comfortable in hot weather and less comfortable in cold weather. Convective heat transfer can be discouraged or encouraged by using or not using insulation and wind barriers.



Cold Weather



Warm Weather

X-Static—The Cold Weather Solution

Any cold weather solution must address radiation, evaporation and convection. X-Static addresses these heat transfer mechanisms using the following principles:

Reflectivity: Silver has an Infrared (IR) Reflectivity rating of greater than 95%, the highest of any element. In other words, 95% of the radiative energy that contacts silver will be reflected back to its source. As a result, X-Static minimizes radiative heat loss by actively reflecting the body's energy back to the skin. X-Static apparel designed for cold weather will therefore be significantly warmer than apparel without X-Static.

Emissivity: Silver has one of the lowest emissivity ratings of any element, which means that it radiates thermal energy very slowly. Silver will remain warm for a very long period of time (as opposed to other elements, which would remain hot for a very short period of time). With X-Static apparel designed for cold weather, any heat not reflected back to the body by the fiber will be absorbed and stored in the fiber for an extended period of time. As a result, the X-Static product will keep the wearer warmer longer than a passive fiber system.

Moisture Transfer: X-Static enhances the natural movement of moisture through hydrophobic materials the same way the body does—by using evaporation. When X-Static is placed in a moist environment with another hydrophobic material, the conductivity of the X-Static will act to accelerate the evaporation of moisture. As moisture is evaporated, a correspondingly greater amount of moisture can be drawn through the hydrophobic yarn system for subsequent evaporation. As a result, X-Static apparel will transport moisture away from the body faster, allowing for a more comfortable environment and less potential for convective heat loss.

X-Static—The Warm Weather Solution

As the temperature warms, radiation is no longer the primary cause of heat transfer. Any warm weather solution must address conduction, evaporation and convection. X-Static addresses conduction and evaporation (convection must be built into the fabric design) using the following principles:

Thermal Conductivity: Silver is the most thermally conductive element on the planet. X-Static, therefore, works to quickly and evenly distribute and transfer heat throughout a product. In warm weather, when conduction is the primary means of heat transfer, X-Static enhances the body's natural actions by accelerating the conduction of heat from the skin (a fabric without X-Static would simply be a barrier to heat conduction). Much like a silver spoon in a cup of hot tea, X-Static will conduct the heat from the skin to the ambient air, thereby cooling the body.

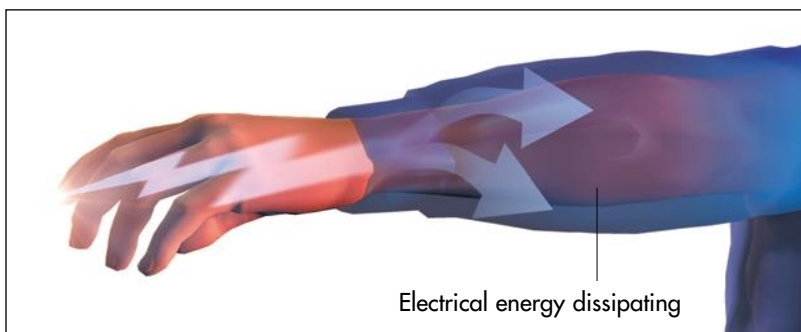
Moisture Transfer: As described above, X-Static accelerates the movement of moisture through evaporation. As a result, X-Static apparel allows for increased comfort in warm weather by minimizing moisture contact with the skin.

ANTI-STATIC

Everyone has experienced the effects of static electricity. Receiving a static shock or feeling static cling is a simple annoyance for most of us; however, it can be extremely hazardous in many industrial settings. X-Static is known worldwide as the premier anti-static yarn for consumer and industrial applications.

Static electricity is a phenomenon called *static discharge*, or *triboelectric charging*. Walking across your carpet in regular socks, which causes two non-conductive materials to rub together, can create charges in excess 50,000 volts (ouch!). Dry conditions, such as those that exist during the winter months, and synthetic materials amplify the problem. The only way to minimize or eliminate the problem is to dissipate the electrical charges through a conductive material.

Silver has the highest electrical conductivity rating of any element. Therefore, X-Static, which is coated with pure silver, will conduct electricity extremely efficiently. Just a small quantity of X-Static in apparel or socks will instantly dissipate triboelectric charges, resulting in static-free, comfortable products.



X-Static is used in several FDA approved medical devices for its therapeutic qualities. Examples include TENS units (electrical stimulation devices for pain relief) and diabetic foot care products. The mechanisms of action in these therapeutic devices are electrical and thermal conductivity.

Using the foot as an example, many people claim to experience acupuncture-like effects when wearing X-Static socks. Another common observation is the elimination or significant reduction of edema (swelling). People also claim that their feet do not feel as tired as they do without X-Static socks. Today, X-Static is widely touted in Asia for its therapeutic effects in numerous products.

Why is there such a profound effect?

Electricity: The body consists of thousands and thousands of nerves that reach the surface of the skin. In fact, the bottom of the foot alone has more than 7,000 nerve endings. The body uses these nerves to transmit electrical signals, including the feeling of pain and discomfort. Because silver is the most conductive element, X-Static products will pick up the electrical charges on the surface of the skin and dissipate them (much like external triboelectric charges). The result is less discomfort.

Magnetism: Whenever electricity passes through a medium, a magnetic field is created. Therefore, when the electrical currents from the body are distributed throughout the X-Static fiber, a magnetic field is created around the body. Beyond the traditional belief in the benefits of magnetic therapy, many prestigious healthcare institutions have recently published studies defending the claim that magnetic products will increase blood flow and reduce swelling. It makes sense, then, that people wear X-Static socks on long airplane trips so that their feet will not swell.





EDUCATIONAL VALUE

Despite the widespread use of silver in products for healthcare, the high-tech industry and the household, very few people are aware of its unique attributes. As a result, X-Static offers the opportunity to educate the buyer.

The ability to educate a customer is the single most important factor in establishing a long-term relationship. In 1990, 70% of the buyers of Fortune 500 companies viewed education as the most important function of a successful salesperson. Education translates into loyalty and offers a salesperson the opportunity to provide a service, as well as a product. X-Static is the perfect education vehicle.

We recommend the following informal quiz as a guideline for teaching the benefits of silver:

Q: What was the first drug you ever received?

A: Silver. Silver nitrate eye drops are given to babies at birth to prevent infection. In a medical sense, we are all "baptized" by silver.

Q: If you were to severely burn yourself anywhere in the world, what would the doctor use to treat you?

A: Silver. Silver cream is used to prevent infection after severe burns. Because the natural protection of the skin is compromised, burn patients must have the best bacteria protection available.

Q: What is the most electrically conductive element?

A: Silver.

Q: What is the most thermally conductive element?

A: Silver.

Q: What has the highest thermal infrared (IR) rating?

A: Silver.

Q: What is the most effective electromagnetic interference (EMI) shielding element?

A: Silver.

The point of this exercise is simple: Although everyone knows that you can buy groceries with silver, most are probably not aware of the miraculous spectrum of qualities inherent to silver. It adds a whole new meaning to the term "precious metal."

By the time people reach the age of understanding, at approximately three to four years of age, they have been inundated with positive messages about silver. A few examples:

Born with a silver spoon in your mouth

This originally meant that you had a better chance of surviving childhood. We now know that silver kills E-Coli and salmonella. Both of these organisms were prevalent on non-silver eating utensils and were a common source of infant sickness and mortality.

Every cloud has a silver lining

The aristocracy in Rome and elsewhere during the Middle Ages drank from silver goblets, which were known to provide natural antibacterial protection. Because people equated silver with clean water and because rainwater was considered clean water, the two were joined: silver-like water was the advantage of poor weather.

He is silver-tongued

Today this saying refers to the wisdom or cleverness of an individual. However, the saying originally dates back to the Middle Ages, when royalty would test their wine for poison with a silver rod. If the rod turned black, it meant that there was arsenic in the wine. So, if you had a silver tongue, you possessed supernatural talents.

I wish I had a silver bullet...

These are a few of the countless sayings about silver that transcend cultural differences. Each culture has similar, if not identical, sayings. The intrinsic understanding of the value of silver is, therefore, common around the world.

Because of the intrinsic value of silver and because silver is used as a currency around the world, you do not have to explain to a consumer why a product that contains silver is going to cost more. They expect that it will cost more and, because of the value, they are willing to pay more.

X-Static is not confined by traditional price point barriers. Rather, it offers the ability to truly focus on value: Intrinsic Value, Educational Value and, ultimately the most important, Performance Value.

CLINICAL RESEARCH

Pennsylvania State University, ©1987

Silver-Coated Nylon Fiber as an Antibacterial Agent
Antimicrobial Agents and Chemotherapy
American Society of Microbiology

This published and peer reviewed study definitively proved the antibacterial properties of X-Static. This analysis also verified that an extract derived from the fiber was bactericidal. This attribute explains the disinfecting quality witnessed by the wearing of hosiery containing X-Static. Of particular interest, the efficacy of X-Static was demonstrated to be more bactericidal than silver nitrate.

Pennsylvania State University, ©1987

Effect of Silver Coated Thread on the Microbial Population of Shoes

"Interest in the project developed from our previous studies, from which we found that silver coated thread (X-Static) was remarkably inhibitory to the growth of and reproduction of several human pathogenic bacteria. Obviously, the presence of silver in the right shoe of the volunteers greatly diminished the total count of microorganisms and their associated odors."

Pennsylvania State University, ©1987

Effect of Silver Coated Thread on the Microbial Population of Carpets

"Interest in the project developed from our previous studies, from which we found that silver-coated thread (X-Static) was remarkably inhibitory to the growth of and reproduction of several human pathogenic bacteria. In conclusion, the incorporation of silver-coated thread into carpet severely inhibits microbial growth and reproduction in carpets."

Cornell University, ©1987

Newly Made Antibacterial Braided Sutures: In Vitro and In Vivo Biocompatibility Study
Journal of Biomedical Materials Research

This published and peer reviewed study demonstrates antibacterial properties toward new and established bacterial colonies. Additionally, the biocompatibility data suggested that the X-Static fiber implanted into gluteal muscle caused less of an inflammatory reaction than that of ordinary nylon. This study reaffirms the intrinsic safety of X-Static.

Cornell University, ©1987

In Vitro Quantitative Study of Newly Made Antibacterial Braided Nylon Sutures
Surgery, Gynecology & Obstetrics

This published and peer reviewed study is another example of the bacteriostatic qualities of X-Static. As could be expected, the performance of the fiber was excellent. Of particular note, this study demonstrates that silver ions will migrate into wound sites through electrophoretic activity.

United States Army Institute of Surgical Research, ©1995

Enhanced Survival of Autopidermal-Allodermal Composite Grafts
The Journal of Trauma, Injury, Infection and Critical Care

"We have previously described antimicrobial effects and enhanced wound healing in experimental burns and grafts treated with silver/nylon dressings, either with or without

CLINICAL RESEARCH

application of direct current. The results show as previously described for primary grafts, that silver/nylon with direct current shortens the time of reepithelization when compared to silver/nylon without DC or VG controls”.

United States Army Institute of Surgical Research, ©1995

Direct Current Reduces Wound Edema after Full Thickness Burn Injury in Rats

The Journal of Trauma, Injury, Infection and Critical Care

This study was conducted with the aforementioned study referencing the performance of silver/nylon bandages. In this study, silver nylon dressings were demonstrated to reduce edema (swelling and fluid accumulation) in full thickness burns.

New York University, September 7th, 1997

Independent Third Party Testing

Dr. Philip Tierno

This study utilized the traditional Kirby-Bauer method for determination of antimicrobial efficacy. The results confirm not only the excellent performance of X-Static as an antimicrobial agent but also show that the fabric tested was effective in killing MULTI-DRUG resistant bacteria. The testing confirms that X-Static is a viable and cost effective mechanism to address the growing problem of antibiotic resistant microbes.

NAMSA

Independent Third Party Testing

United States

NAMSA is one of the most well respected independent laboratories in the United States. It is both EPA and FDA certified. These numerous tests verify the exceptional performance of X-Static. Of note in these studies is that they indicate that X-Static is a broad-spectrum antibacterial agent. NAMSA testing also indicates the exceptional performance of X-Static as an anti-fungal; specifically against T. Mengatrophytes the fungus which causes Athlete's Foot.

Tokai University, May 1997

Independent Third Party Testing

Dr. Seiki Tazume and Dr. Takahiko Yoshida

This study conducted in Japan demonstrated in a real world setting, consisting of 20 volunteers, that X-Static demonstrated an excellent reduction in bacterial and fungal counts. These results coincide with the rapid development of the Japanese hosiery market. X-Static is widely recognized in Japan as the most effective antimicrobial alternative. X-Static is approved by the Ministry of Health in Japan as an antimicrobial agent and exceeds the industry minimum standards of performance.

Additional Information:

- X-Static is an approved antimicrobial agent and registered with the EPA.
- X-Static is used in many FDA approved products, ranging from bandages to Class II medical devices used in corneal transplants.
- Noble Fiber Technologies is registered with the FDA as a medical device manufacturer.

..... FREQUENTLY ASKED QUESTIONS

Is Silver Safe? Is X-Static safe?

Silver is widely used today in medical products and in consumer products. In fact, the very first drug most people receive when they are born is silver nitrate, in the form of eye drops. Today, silver is used in everything from burn care products for infection control to eating utensils. The best colloquial example is the abundance of silver fillings for dental repair (although there has been a movement away from silver because of the dangers of the mercury that was used with it in the past).

X-Static is extremely safe because it is made with pure silver. Prestigious institutions throughout the world have validated the antimicrobial performance and safety of X-Static in published medical journals.

How long does X-Static protection last?

X-Static lasts for the life of the garment. Silver is permanently and irreversibly bound to the surface of a fiber to create X-Static. It cannot wash off or wear off. We have tested X-Static for more than 250 washes with virtually no reduction in performance. The wash testing was stopped only after the garment fell apart.

Are some people allergic to silver?

Some people are allergic to silver jewelry and make the assumption that they are allergic to silver. On the contrary, silver jewelry is made of an alloy called “sterling silver” and the people are allergic to the various other metals in its makeup. X-Static is made with pure silver—there have been no documented cases of allergies to pure silver.

What kind of testing has been performed on X-Static?

X-Static is registered with the EPA and has more than 12 years of published clinical research supporting its safety and claims. X-Static is also used in many of Class 1 and Class 2 FDA approved medical devices. The top medical institutions in the world, including Johns Hopkins and the National Institute of Health, have tested, approved of and currently use X-Static.


Should I be nervous about using an antimicrobial?

Yes, if it is not X-Static. X-Static is not like other antimicrobial products. First, X-Static is natural and there is no fear of toxicity. Second, X-Static has all of the requisite regulatory approvals. Third, X-Static is not just an antimicrobial. It happens to be the best antimicrobial product, but it also has many other valuable attributes.

How much silver is actually in X-Static?

The amount of silver varies, depending on the specific product, but X-Static generally contains about 15% pure silver.

HANG TAGS



This sock features X-Static® The Silver Fiber™

anti-odor
regulates temperature
natural & safe
permanent

X-Static is a high performance fiber system made with pure silver. Silver is naturally antimicrobial, enabling X-Static to safely inhibit the growth of odor-causing bacteria and fungi in the sock. Silver also has the best possible thermodynamic properties, so your feet will stay cooler in the summer and warmer in the winter. More than 10 years of research and testing stand behind the unparalleled performance of X-Static.

regulates temperature

- X-static working
- odor
- silver ions



anti-odor
regulates temperature
natural & safe
permanent



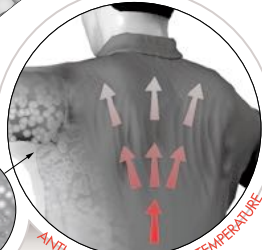
THE SILVER FIBER™

www.silverfiber.com



THE SILVER FIBER™

ANTI-ODOR
REGULATES
TEMPERATURE



ANTI-ODOR • REGULATES TEMPERATURE

- odor
- silver ions
- X-static working

ANTI-ODOR
REGULATES
TEMPERATURE

Inhibits the growth of odor-causing bacteria and fungi in the product. Also neutralizes ammonia and denatured proteins.

Optimal thermodynamic properties to keep you cooler in the summer and warmer in the winter.

This product features X-Static® - The Silver Fiber™

X-Static is a high performance fiber system made with pure silver. Silver is naturally antimicrobial, enabling X-Static to safely inhibit the growth of odor-causing bacteria and fungi in this product. Silver also has the best possible thermodynamic properties, so you will stay cooler in the summer and warmer in the winter. X-Static is safe and natural and will last for the life of the product. More than 10 years of research and testing stand behind the unparalleled performance of X-Static.

WILL NOT WASH OFF OR WEAR OFF.
LASTS FOR THE LIFE OF THE PRODUCT.

Safe, no chemicals.

PERMANENT
NATURAL



[www. noblefiber.com](http://www.noblefiber.com)

NOBLE FIBER TECHNOLOGIES

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