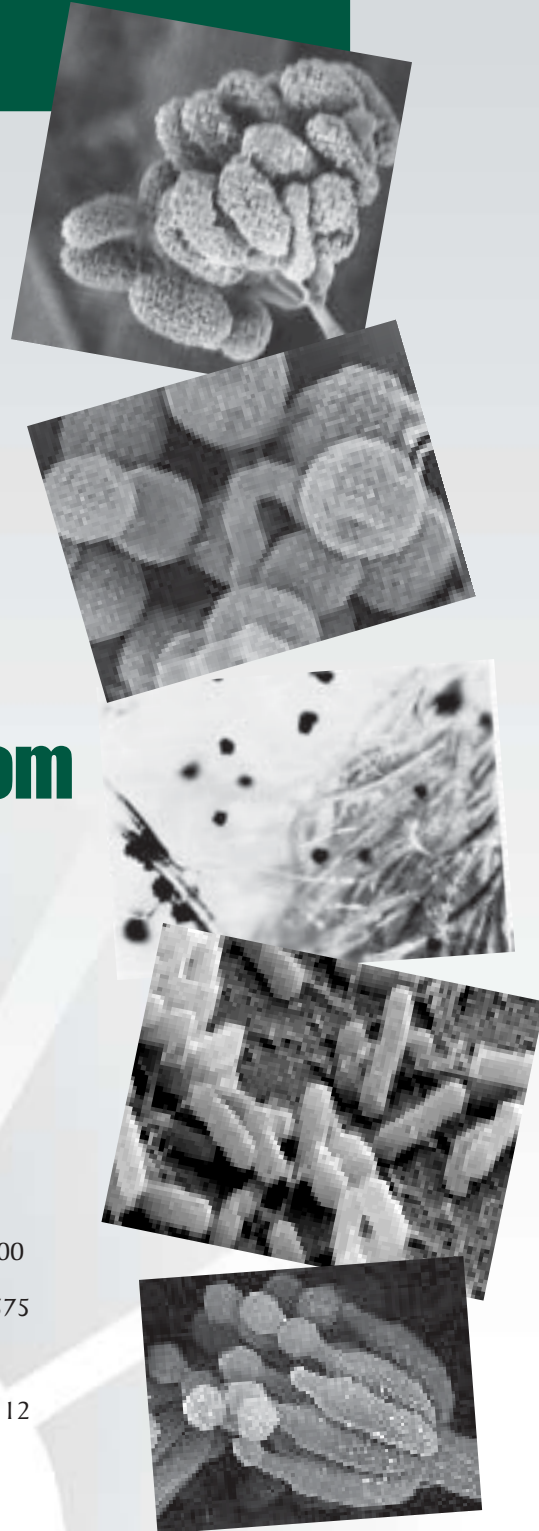


**THE AEGIS MICROBE  
SHIELD TECHNOLOGY  
DEMAND IT!**



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



CORPORATE: 2525 Washington Street • Suite 500  
Midland, Michigan 48642 USA  
989.832.8180 • Fax 989.832.7575

LABORATORIES: 3106 Swede Avenue  
Midland, Michigan 48642 USA  
989.832.8775 • Fax 989.633.7112  
800-241-9186

**MICROBIAL  
GROWTH =  
ODOR. ROTTING.  
STAINING. AND  
MORE.**



**Facts about antimicrobials**





## Antimicrobials

Consumers are buying antibacterial and antimicrobial products at a record pace. Concern is spreading with the emergence of adapted "superbugs" that have, over time, become resistant to conventional treatments. Drug resistant microbes are an increasing concern to medical professionals and scientists. Microbes are living creatures and will take incredible steps to ensure survival. Studies show that when microbes are exposed to sub-lethal doses of antimicrobials, they can mutate and create resistant properties. With the rapid reproductive rate of microbes, generations of these resistant strains can appear in a very short time.

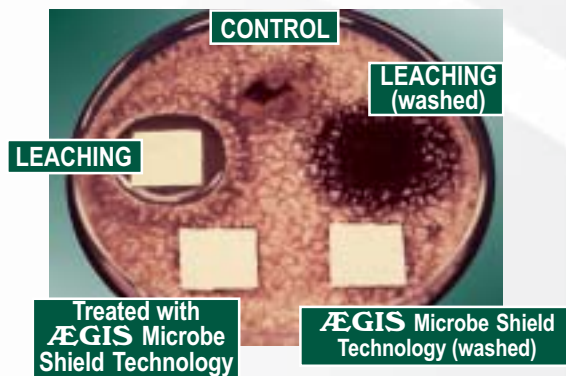
## Traditional Technologies

Traditional antimicrobials rely on migration of a lethal dose of active ingredient from a surface to chemically attack organisms. Their active chemicals diffuse from treated products so that they can contact and enter living organisms. Once inside, their killing or deactivating mechanism is free to destroy the organism. This migration is demonstrated by the "halo" or "zone of inhibition" which is shown in the photograph below of a standard AATCC 147 test.

- Chemically poisons the cell and can be used up
- Creates a zone of inhibition
- Creates an environment for adaptive microorganisms to develop

## Physical vs. Chemical Action

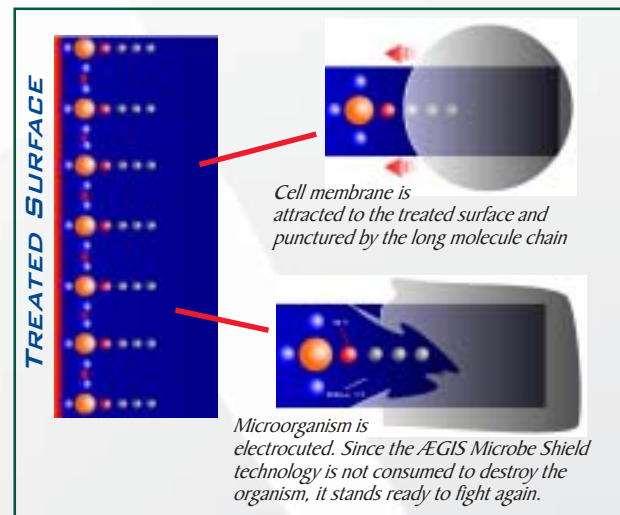
In contrast to traditional antimicrobials, the ÆGIS Microbe Shield technology controls microbes by physically piercing and then disrupting the electrical component of the cell membrane – destroying it. A primary benefit is that this unique mode of action does not create the conditions which promote microbial adaptation or resistance.



The ÆGIS Microbe Shield technology is unique because it imparts a durable, wash-resistant, antimicrobial finish to a wide variety of substrates. The illustration displays these advantages. In contrast to conventional antimicrobial agents, there is no zone of inhibition. This demonstrates that no active ingredient is lost to the environment and the ÆGIS Microbe Shield technology is permanently bonded to the surface, even after washing. The leaching technology shows a halo or zone of inhibition, but is completely overgrown with microorganisms after several washings. The ÆGIS Microbe Shield will continue to be fully effective as long as the surface remains intact.

## The ÆGIS Microbe Shield Technology

The ÆGIS Microbe Shield technology is a significantly different and unique antimicrobial technology that remains permanently affixed to the surface to which it is applied. Since the antimicrobial stays on the substrate and does not leach or migrate, it does not cross the skin barrier, does not affect normal skin bacteria, cause rashes or skin irritations. This organofunctional silane technology is not consumed by the microorganism and does not poison the microorganism, but works as a physical control. It has been used successfully to treat surfaces from leather and foams to virtually all types of fabrics and indoor environments. This antimicrobial technology has been verified by its worldwide use in consumer and medical goods including socks, surgical drapes and carpets. This technology has been used for over twenty-five years without any human health or environmental problems in manufacturing facilities or in actual end use situations.



Typically applied in a single stage of the wet finish process, the attachment of the antimicrobial to surfaces involves two means. First, and most important, is a very rapid process which coats the substrate with the cationic species (physisorption) one molecule deep. This is an ion exchange process by which the cation of the silane compound replaces protons from water or chemicals on the surface. The second mechanism is unique to materials such as silane quaternary ammonium compounds. In this case, the silanol allows for covalent bonding to receptive surfaces to occur (chemisorption). This bonding to the substrate is then made even more durable by the silanol functionality, which enables it to homopolymerize. After it has coated the surface in this manner, it becomes an integral and permanent part of the surface – even on surfaces with which it cannot react covalently.

Untreated leather sample



This test clearly shows the traditional antimicrobial as it migrates off the surface creating a zone of inhibition. As the chemical moves to the microorganism, it is consumed and the organism is destroyed. Over time, the one celled organisms can develop resistance to the antimicrobial.



This test demonstrates the unique technology of the ÆGIS Microbe Shield antimicrobial. It is a permanent part of the surface it protects and does not require consumption; therefore, it does not create the environment for adaptation.

## Verification

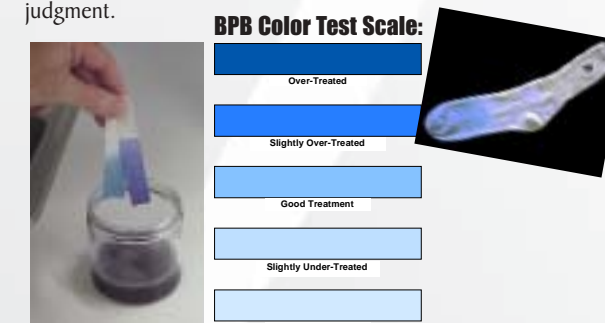
Since conventional antimicrobials are generally invisible after being applied to a substrate, their presence is difficult to verify – either for mill quality control purposes or to insure that products on the retail shelf have actually been treated. Normally, detection of the antimicrobial active requires sophisticated and expensive chemical analysis.

The presence and intensity of the ÆGIS Microbe Shield treatment can be visually confirmed at the mill or in a store in a matter of minutes with a simple staining test. This is an extremely important part of a quality assurance program that can give the manufacturer, the retailer and the consumer confidence that this desirable, but invisible feature, is actually present and working.

## Bromophenol Blue Staining

The only requirements for verifying the presence of the ÆGIS Microbe Shield treatment are a readily available chemical reagent known as bromophenol blue (BPB), water, a few minutes and a sample to be tested.

The sample is dipped into a diluted BPB solution and then rinsed with water. By complexing with the quaternary ammonium functionality provided by the antimicrobial treatment, the BPB stain attaches to the substrate and will not rinse away. The stain level may then be compared to the visual standards for a pass or fail judgment.



## The Mark of Excellence

Consumers are looking for solutions to their microbial problems and the ÆGIS Microbe Shield's unique technology is the answer. The ÆGIS Microbe Shield trademark is highly recognized worldwide including the United States, Canada, India, South East Asia, and Europe.

The use of the ÆGIS Microbe Shield technology not only provides a unique feature to your product, it also creates new pathways in marketing and sales through press releases, product reviews, and consumer education programs. Many consumer products are taking advantage of the recognized quality that the ÆGIS Microbe Shield trademark represents.

When you display the ÆGIS Microbe Shield trademark, your product emphasizes its high tech nature and sets it apart from the rest of the pack! Ask a sales representative about how our hang tag assistance can increase your sales and confidence.



## The ÆGIS Microbe Shield Difference.

Quality. Safety. Durability. Effectiveness.

These all add up to a valuable feature for treated products and a big gain in sales!

- Applicable to virtually all substrates, including natural and synthetic fibers
- Does not rub off or migrate onto the skin
- Controls or eliminates objectionable odors, unsightly stains, and product deterioration
- Does not create the environment that causes adaptive micro-organisms
- No arsenic, tin, heavy metals, or polychlorinated phenols
- Accepted and registered worldwide
- The confidence of more than 25 years of safe and effective use
- Unsurpassed technical, scientific, marketing and sales support that includes a professional microbiology laboratory
- A chemical finish easily applied at the mill and incorporated into the wet finish process
- Improved hand for most fabrics
- The ÆGIS Microbe Shield protects against microbial growth, but will not leach onto the skin or cross the skin barrier
- Verification: the only antimicrobial quickly and easily verifiable on the product, whether at the mill, the distribution center, or on the retail shelf.
- Used successfully in high performance applications where safety and performance is paramount such as clean room garments and medical fabrics
- Used to protect indoor surfaces of buildings
- A quality assurance database that extends from the foundation science of the technology to the manufactured product
- Produced exclusively for ÆGIS Environments in an ISO 9002 facility



A 25 year history of proven safety and durability in countless products, even after multiple washings.