

Make Your Mark in the World . . .with ours!

The ÆGIS Microbe Shield® certification stands for over 30 years of superior technical performance in medical goods, consumer products, and indoor environments. Universally recognized as the best antimicrobial of choice for a variety of uses, it has been accepted by regulatory bodies globally. Most importantly, it has been embraced by consumers who have purchased ÆGIS protected products from retailers all over the world.

Consumer Confidence.

The ÆGIS Microbe Shield technology can be found on a wide range of consumer products including socks, footwear, sporting equipment, hospital linens, medical and healthcare fabrics. Consumers look to the ÆGIS Microbe Shield certification as the solution to their microbial problems. Among odor controlling antimicrobials, the ÆGIS trademark is one of the most highly recognized in the United States, Europe, India, and Southeast Asia.



When a product displays the ÆGIS Microbe Shield certification mark, it provides confidence to consumers that the product is protected by the most advanced, durable, and effective antimicrobial technology available.



Take advantage of the expertise of our design team to create unique labeling or work together in adapting your current marketing efforts using the ÆGIS Microbe Shield trademark program.



Cutting Edge Technology.

A product labeled with the ÆGIS Microbe Shield trademark shows consumers that, not only are you using an antimicrobial, but that you are using the most advanced antimicrobial on the market today.

Contact your ÆGIS sales representative for more information on sales and marketing benefits as well as the qualification requirements of the ÆGIS Microbe Shield Program.

800-241-9186



2205 Ridgewood Drive • Midland, MI 48642 USA
989.832.8180 • Fax 989.832.7572
800-241-9186 • www.aegismicrobeshield.com

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Controls Odor

Durable

**Environmentally
Friendly**

**Frequently Asked
QUESTIONS**

ægis

**Protecting the products that protect you
and your environment.**



1. **What is the difference between the ÆGIS Microbe Shield® products and other antimicrobials on the market?**

Conventional products are absorbed by living cells and kill by way of poisoning the organism or disrupting a vital life process. They are designed to move from the surface and dissipate quickly. Most commercial antimicrobials used for treating surfaces do an adequate job of killing bacteria and fungi, although most have a limited range of effectiveness.

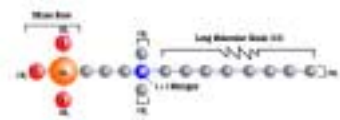
The ÆGIS technology takes a totally unique approach. It provides an effective initial microbial kill when applied, but, unlike the conventional methods, it also provides long-term control of growth on treated surfaces, often for the life of that surface. When the ÆGIS technology is used, it modifies the surface to make it antimicrobially active.

2. **What kinds of products use the ÆGIS Microbe Shield® technology?**

The ÆGIS Microbe Shield protects a large number and variety of products from odor, deterioration and contamination. From socks to diapers and ceiling tiles to sporting goods, the ÆGIS Microbe Shield protects some of the world's most trusted products.

3. **How does the ÆGIS Microbe Shield® technology work?**

The active ingredient in the ÆGIS technology forms a colorless, odorless, positively charged polymer that molecularly bonds to the treated surface. You could think of it as a layer of electrically charged swords. When a microorganism comes in contact with the treated surface, the C-18 molecular sword punctures the cell membrane and the positive electrical charge zaps the cell. Since nothing is transferred to the now dead cell, the antimicrobial doesn't lose strength and the molecule is ready for the next cell to contact it.



4. **What is the purpose of the silane portion of the molecule?**

Silanes are extremely efficient bonding agents that can be coupled to other molecules and then used to permanently bond those molecules to a target surface. Our antimicrobial silane modifies virtually any surface and transforms it into a material that does not support microbial growth.

5. **What antimicrobial is used?**

The ÆGIS active ingredient is 3 trimethoxysilylpropyloctadecyldimethyl ammonium chloride. The optimum application level will vary by substrate, but generally the level is approximately 0.25% of the antimicrobial active ingredient onto the weight of the substrate. As an example, one kg of active ingredient will treat 400kg of shoe liners.

6. **Does the antimicrobial use a heavy metal?**

No. The ÆGIS Microbe Shield products do NOT contain any heavy metals. Tin, arsenic, silver and copper are often used in other antimicrobials.

7. **Labels for ÆGIS products include the phrase: "A Silane Quaternary Ammonium Salt". Do the ÆGIS products act the same as common household or hospital quats?**

No. In addition to their remarkable safety profile, what makes the ÆGIS products unique is that, unlike quats, they are extremely long lasting and are very effective at controlling a wide range of microbes (bacteria, fungus, algae, mold, mildew, etc.). The ÆGIS products are best described as "organo-functional silanes" with a quaternary ammonium component. Silanes are recognized as exceptional bonding or coupling agents. In simpler terms, the silane part permanently attaches the molecule to almost any surface and the quat provides the antimicrobial activity. The silane bond magnifies and greatly improves the quat's effectiveness by concentrating and directing its field of activity. Standard quats are effective short-term sanitizers, but they do not provide long term protection to surfaces or manufactured goods. Since they have no ability to bind to surfaces, they are easily washed away or dissipated. Because of that and other weaknesses, they are not particularly effective against fungus, yeast, algae or Gram (-) bacteria.

8. **Against what types of microorganisms is the ÆGIS Microbe Shield technology effective?**

Unlike conventional antimicrobials which typically have a limited spectrum of activity due to the chemical nature of their mode of action, laboratory testing performed on the ÆGIS Microbe Shield technology over more than 30 years shows consistent effectiveness against most Gram (-) and Gram (+) bacteria, fungi, and algae. This is most likely attributable to the unique physical/electrical nature of its mode of action. A representative list of microbes against which the ÆGIS Microbe Shield technology has been tested may be obtained by contacting our corporate office.

9. **Will its use result in superbacteria?**

No. Adaptation studies show that microbes do not adapt to the ÆGIS Microbe Shield and no "Zone of Inhibition" develops.

10. **Will the ÆGIS Microbe Shield be effective after laundering?**

Yes. For example, testing has proven that the ÆGIS Microbe Shield technology still provides 99% reduction of standard test organisms on polypropylene 150 den/68 fil through more than 75 launderings at 60° C (hot water). Published peer reviewed papers show similar results with a variety of fabrics and goods. Details may be obtained by contacting your sales representative.

11. **Is the ÆGIS Microbe Shield effective against dust mites?**

Extensive testing shows that dust mites rely on fungus as an important part of their food source. By controlling fungus, the food source is dramatically reduced and the dust mite population is controlled. Testing by independent laboratories confirms these dust mite reductions in material treated with the ÆGIS Microbe Shield.

12. **Is maintaining pure white color during treatment a problem?**

No. Although yellowing can occur anytime changes are made in a textile finish process, the ÆGIS Microbe Shield does not create yellowing problems when applied properly. In fact, ÆGIS is specified by retailers like Wal-Mart and JCPenney that have exacting whiteness standards.

13. **Will this technology adversely affect the skin or environment?**

No. Since the antimicrobial is permanently bound to the surface it protects, it does not leach from the fabric onto the skin or into the environment as do many competitive antimicrobials. Extensive toxicological testing shows that the antimicrobial does not cross the skin barrier or cause irritation or sensitization.

14. **How is the treatment applied?**

The ÆGIS products are applied in aqueous solution and can be incorporated into almost any wet process during manufacturing at the mill. They can also be applied to finished goods. The antimicrobial is easily integrated into most pad, spray, and exhaust processes. The antimicrobial is cationic so it mixes well with other cationic and nonionic finishes (most softeners) and applies well in the same bath.

15. **Do the ÆGIS products give off gases after application?**

No. They do not volatilize, dissipate, or leach onto other surfaces or into the environment. The chemistry polymerizes where it is applied and forms a permanent bond that typically lasts for the life of the treated surface. Normal cleaning should not remove the treatment; although it can be abraded away.

16. **How long does the treatment last?**

Since the cured antimicrobial is nonvolatile, insoluble, and non-leaching, the treatment should last for the life of the treated surface. The life of a treated surface depends on a number of factors, not the least of which is surface preparation. If you treat a dirty or unstable surface, when the dirt comes off or the surface is disturbed, some of the antimicrobial will be removed with it. Abrasive or caustic (pH>10.5) cleaners can also shorten effective life.

17. **Is there a simple test method to determine if the ÆGIS polymer is present?**

Yes. A simple method of detection is available to demonstrate the presence or absence of the active ÆGIS Microbe Shield treatment. Bromophenol Blue (BPB) stain testing of the treated substrate clearly shows the presence of the ÆGIS Microbe Shield in a matter of minutes, visible by the blue dye.



The sock on the right is well treated; the sock on the left is untreated according to the BPB testing.

18. **What standard tests does ÆGIS perform to demonstrate antibacterial activity?**

In addition to the BPB staining, microbiological testing gives the BPB analytical procedure its validity for use as a Quality Assurance and Quality Control tool. Our standard microbiological test is an industry standard, ASTM E2149 "Standard Test Method for Determining the Antimicrobial Activity of Immobilized Antimicrobial Agents Under Dynamic Contact Conditions". We have completed scientific studies correlating the ASTM E2149 antibacterial activity to real world wear tests and odor panel studies demonstrating the effectiveness of our treatment. ÆGIS has set analytical and antimicrobial performance standards to meet our quality control criteria.

19. **How long does it take for microbiological testing?**

ÆGIS maintains three fully staffed microbiological laboratories around the world that will work to provide approximately two-week turn around times for antibacterial testing. Antifungal and other more complex testing can range from one through six weeks to complete.

20. **How much do these tests cost?**

The cost for microbiological testing can range between \$125 and \$300 per test. Contact your ÆGIS sales representative to determine if you qualify for free developmental and QC testing.

21. **What other tests will ÆGIS perform?**

We have over 30 years experience in performing extensive microbiological tests and can perform the majority of global industry standard methods in addition to specific verification tests for claim validation. ÆGIS has a long history of bacterial and fungal testing on many products including shoe linings, leather, textiles, carpet, and building products.



22. **Why are the ÆGIS antimicrobial products so durable?**

Because of their exceptional molecular bond, the bonded polymer is neither soluble nor volatile. The unique bond results in the ÆGIS antimicrobial polymer becoming an integral part of the substrate.

23. **What is the cost of this treatment?**

The cost to treat one pair of cotton athletic socks with the ÆGIS Microbe Shield technology in the United States is under 3¢. The cost of the treatment per pair of shoes should be well under 6¢ per pair. For a typical flat textile fabric it will cost approximately 10¢ per pound. Charts are available as a cost comparison based on the percentage of add rate to how much it costs per pound.