Reducing Microbial Sourced Contamination in Hospital Blankets.

ÆGIS Environments conducted a study that compared blankets treated with the ÆGIS Microbe Shield technology to blankets that were untreated. These bacteria represented a wide spectrum of Gram (+) and Gram (-) organisms capable of producing staining deterioration, odors, and an increased risk of health consequences.

Simulation Study:

Treated and untreated blankets were used to towel off sweat from a healthy male after one hour of intense exercise. This was conducted to simulate febrile diaphoretic patients. After the incubation period, it was shown that the untreated samples had three times the bacteria as the treated.

In-Use Study:

Treated and Untreated blankets were studied at a North Carolina 24 hour care facility. The treated blankets showed a 95% reduction in organisms.

This reduction in bioburden reduces contamination risks in the patient environment and provides valuable peace of mind to the user. Additional data has been generated by university, medical and industrial laboratories represent some of the most extensive microbiological work performed on antimicrobial treated substrates for use in the medical community.

Studies available at www.aegismicrobeshield.com

aegis MICROBE SHIELD®

The ÆGIS Microbe Shield® Difference.

Quality. Safety. Durability. Effectiveness.

- Compatible with 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 an environment that promotes adaptive microorganisms
- No arsenic, silver, tin, heavy metals, or polychlorinated phenols
- Accepted, registered and readily available worldwide
- The confidence of more than 30 years of safe and effective use
- Effective against a broad spectrum of all known bacteria, fungi, and algae
- Unsurpassed technical, scientific, marketing and sales support that includes a professional microbiology laboratory
- Easily applied at the mill and incorporated into the wet finish process
- The ÆGIS Microbe Shield protects against microbial growth, but will not leach onto the skin or cross the skin barrier
- Verification: 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 are paramount such as clean room garments and medical fabrics

ÆGIS Means Protection

ÆGIS™

ÆGIS ENVIRONMENTS

2205 Ridgewood Drive • Midland, Michigan 48642 USA
Toll Free: 800-241-9186 • Fax 989-832-7572

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Form 4G17 Rev. 072006

Broad Spectrum Antimicrobial Treatment

ÆGIS Means Protection

For Medical Facilities, Goods, Staff & Patients

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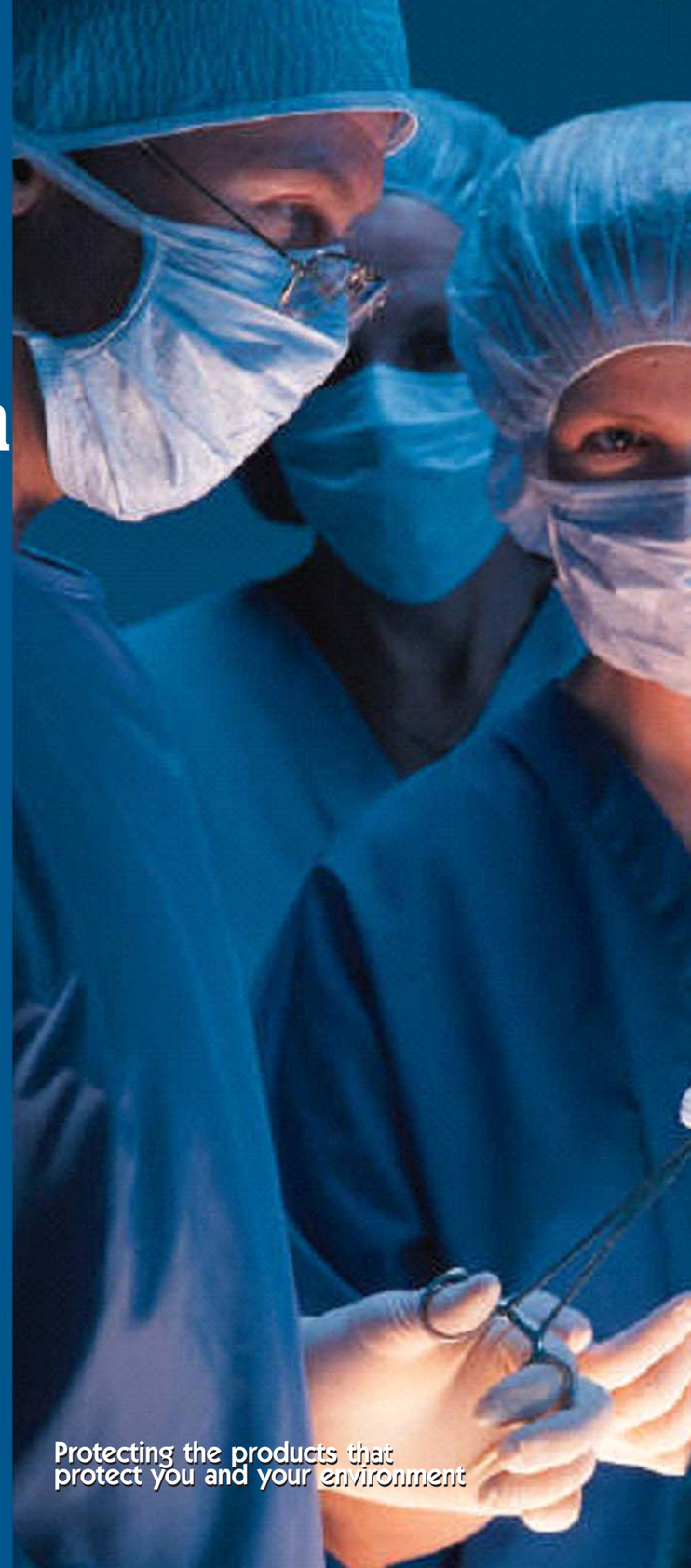


The Leader in Technology & Global Support

Healthcare Environments Demand Protection

The health care industry is challenged with providing the best possible care for their patients and a safe environment for health care workers. Microorganisms are the most prevalent and potent pollutants in the indoor environment and their role as causers and aggravators of disease conditions are well documented.

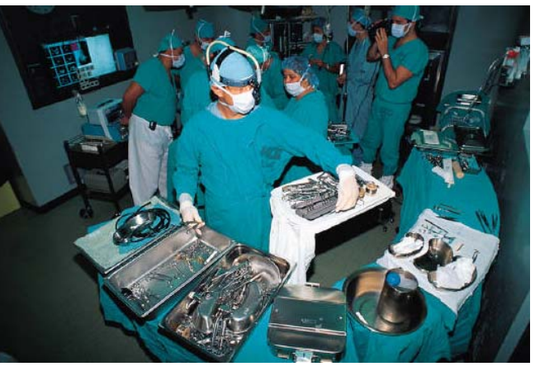
The ÆGIS Microbe Shield™ antimicrobial technology has proven its benefits in textiles and interior surfaces for more than 25 years. It controls micro-organisms, slows the degradation of products, and reduces odors and stains.

The Obvious Choice is ÆGIS

All antimicrobials are not created equal. It is important to understand the basic chemical, physical and biological properties of an antimicrobial so the most effective and safest antimicrobial can be chosen. Our research in the laboratory and actual use on products ranging from baby diapers to carpet and from athletic shoes to ceiling tiles, clearly demonstrates the superior performance of the ÆGIS Microbe Shield technology.

ÆGIS Means Solutions

ÆGIS is designed for easy integration into existing manufacturing processes. From product development through launch, ÆGIS support includes state of the art microbiological testing, regulatory expertise, marketing assistance and an unsurpassed quality control program.



Proven effective to control odor-causing problems in products around the world. The ÆGIS Microbe Shield technology is on sporting equipment, hospital linens, medical and healthcare fabrics. Its unique mode of action minimizes environmental contamination and the development of resistant organisms.

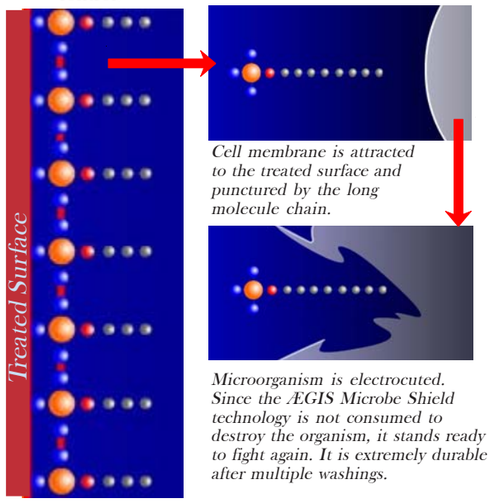
Durability & Safety

The keystone of the ÆGIS Microbe Shield is a micropolymer silane technology that molecularly bonds – directly and durably – to the substrate.

- A non-leaching antimicrobial that does not migrate from the surface. Unlike conventional antimicrobials, it won't transfer onto your skin or leach into the environment.
- Proven history with 25 years of consumer product and indoor environment success.
- Mode of action does not create environment for adaptive organisms.
- Registered for use with the EPA and other regulatory agencies worldwide.
- Physically controls microorganisms on contact and remains permanently affixed to the surface providing durability to multiple washings.
- Quick and easy verification.

How Does it Work?

Because the ÆGIS Microbe Shield technology does not dissipate or leach, it can not be absorbed by the organism — or by you. With the ÆGIS Microbe Shield technology, the cell membrane is physically ruptured. This stabbing and an "electrocution", resulting from the antimicrobial's positive charge, means that the antimicrobial will be fully effective as long as the surface remains intact. Since it is not consumed and does not dissipate, the antimicrobial active is not depleted and continues to control microbial growth. It is a physical control, not a chemical control.

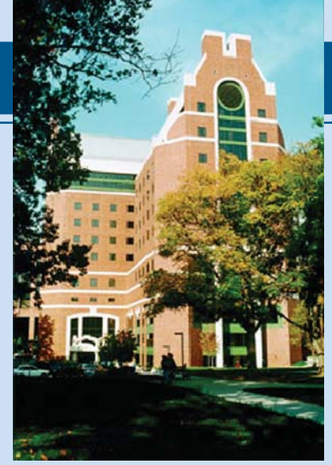


Cell membrane is attracted to the treated surface and punctured by the long molecule chain.

Microorganism is electrocuted. Since the ÆGIS Microbe Shield technology is not consumed to destroy the organism, it stands ready to fight again. It is extremely durable after multiple washings.

Building Component Treatment After the "Flood"

Case Study: The Arthur G. James Cancer Center Hospital and Research Institute at The Ohio State University



The study building is a 12-story comprehensive cancer center and research institute located in Columbus, Ohio. Just prior to its opening in January, 1990, a ruptured water pipe on the 12th floor flooded the building with an estimated 500,000 gallons of water. Ceilings, walls, carpeted floors and upholstered furnishings were either wet or exposed to high humidity.

After assuring that the building's structural integrity had not been compromised, attention focused on restoring the microbiological quality of the building to levels consistent with its intended use, particularly in Bone Marrow Transplant and other areas where immunosuppressed patients would be housed.

Despite high efficiency air filtration, and widespread use of a chlorine-based disinfectant fog throughout the building and its ventilation system, large numbers of fungi and bacteria were retrieved from the air in all areas of the hospital. Large numbers of water-associated bacteria, such as *Acinetobacter sp.*, as well as fungi were retrieved from carpeting.

Prior to the flood, hospital and university researchers had designed a study protocol to investigate the effect of surface modification with silane antimicrobials on infection rates within Bone Marrow Transplant, Hematology and Oncology areas in the hospital. The flood and subsequent microbial contamination preempted the study. But, investigation of various antimicrobial systems to achieve sustained microbial control during the study provided an important tool for use in remediation, and beyond.

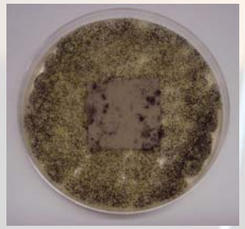
All accessible interior surfaces (including carpeting, ceilings, walls, above ceiling space, furnishings, elevator shafts, mechanical and electrical chases) were treated with the organosilicon antimicrobial 3-trimethoxysilylpropyldimethyloctadecyl ammonium chloride (ÆGIS® Antimicrobial) in water in accordance with the manufacturer's application specifications. The applications were randomly tested for uniformity and penetration throughout the treatment process.

Results

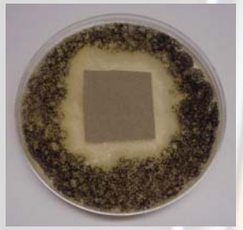
- Pre-treatment retrievals were in a range of 721 – 2,800 CFU's/m^3. Of the 209 sample sites, 122 (58%) sites produced 2,800 CFU's/m^3, the upper detection limit of the sampler.
- Post-treatment sampling during the seven months following restoration of the building produced an average of 4.1 CFU's/m^3 at 643 sites. Retrievals were in a range of 0-25 CFU's/m^3. Of the sample sites, 289 sites (45%) produced 0 CFU's/m^3; an additional 231 sites (36%) produced retrievals in a range of 1-5 CFU's/m^3.
- The second post-treatment samplings were performed in 1991 at 82 sites randomly selected by floor. The samplings produced retrievals in a range of 0-9 CFU's/m3, with an average retrieval of 0.8 CFU's/m3. 40 sites (48%) produced 0 CFU's.
- The final post-treatment samplings were performed in 1992 at 86 sites randomly selected by floor. The samplings produced retrievals in a range of 0-4.7 CFU's/m^3, with an average retrieval of 0.4 CFU's/m^3. 56 sites (65%) produced 0 CFU's.
- Each of the 24 Bone Marrow Transplant patient rooms was negative for microorganisms during all of the post-treatment samplings.

The facility is presently free of odor and has a new appearance unaffected by the extensive application of a surface antimicrobial. No fungal nosocomial infections were recorded in this facility during the 30-month study and a post study check after five years. All renovations or reconstruction in the facility were strictly controlled and all newly added or modified surfaces were treated with ÆGIS antimicrobial for five years after the initial treatment.

UNTREATED SAMPLE



LEACHING ANTIMICROBIAL



Traditional antimicrobials migrate off the surface creating a zone of inhibition. This sample clearly shows the leaching of the antimicrobial into the surrounding environment. The chemical is consumed and depleted as the organism is destroyed. Over time, single celled organisms can adapt to these leaching antimicrobials.

BONDED ANTIMICROBIAL

The ÆGIS Microbe Shield technology is a permanent part of any surface it protects. It is not consumed by the microbes; therefore, it does not create an environment for adaptation. This sample shows no leaching, no zone of inhibition, and no growth on the ÆGIS Microbe Shield protected sample.

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