LONG LASTING ANTIMICROBIAL SURFACE PROTECTION

AEGIS® IN HEALTHCARE

A Short Overview on the use of AEGIS® in Healthcare

Safe | Durable | Effective

Bactraban

PROTECT YOUR BUSINESS FROM INVASIVE MICROBES

SOLE DISTRIBUTOR OF AEGIS® IN SOUTH AFRICA

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1 Introduction

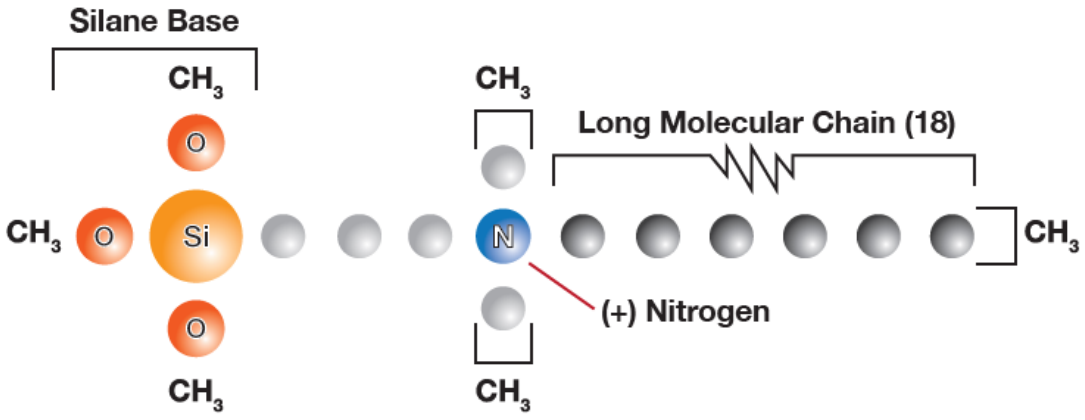
The following information kit was prepared to provide an overview of the history of AEGIS® within the healthcare industry.

2 Technology Overview

AEGIS® (AEM 5700) is the world's most widely used antimicrobial surface coating. AEGIS® Microbe Shield is an enduring Antimicrobial Surface Protectant. It is combined with normal cleaning practices to provide residual surface protection against the growth of bacteria, mould, mildew, fungi, yeast and algae on surfaces.

AEGIS® forms a protective coating that can molecularly bond with surfaces upon application. Bacteria, moulds, and mildew are attracted to the coating's positive charge. When applied to surfaces, AEGIS® forms a colourless, odourless, positively charged barrier that attracts, then electrocutes and disrupts their negatively charged cell membranes. AEGIS® contributes to enduring clean surfaces by utilizing a charge disruption mode of action.

AEGIS® has a long history of delivering durable, long-lasting antimicrobial efficacy to protect treated surfaces.



AEGIS® Active Ingredient: 3-trimethoxsilyl propyldimethyloctadecyl ammonium chloride

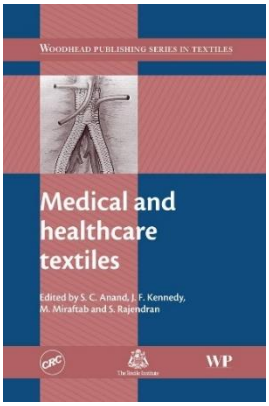
Positively Charged Nitrogen	Silane Base	Long Molecular Chain
The positively charged nitrogen atom attracts the negatively charged cell walls of microbes.	Enables the antimicrobial to anchor securely onto the substrate providing long-lasting antimicrobial product protection.	The long molecular chain or "spike" is the part that comes into contact and disrupts the cell membranes.

3 AEGIS® Efficacy in Healthcare

AEGIS® has been proven to have up to a 99.99% microbial reduction rate. The following list provides a summary of AEGIS® antimicrobial efficacy studies relevant to the healthcare industry. Bactraban has an extensive library of additional case studies and testimonials across several industries. The transit case study was included as it best represents an extreme high-traffic environment to demonstrate AEGIS® durability over an extended period.

Study Name	Summary of Findings
Improved Control of Microbial Exposure Hazards in Hospitals: A 30-month Field Study (USA, 2007)	Airborne and surface microorganism levels were reduced by over 99% sustained the course of 30 months. The nosocomial infection rate was noted to have dropped post AEGIS application for the duration of the study.
Removal and Inactivation of Viruses by a Surface-Bonded Quaternary Ammonium Chloride Antimicrobial Performance of Medical Textiles (USA, 1988)	The University of Michigan tested AEGIS demonstrating inactivation of viruses on the treated surfaces. Study demonstrated antimicrobial and antiviral activity on surfaces treated with AEGIS after several washings.
Antimicrobial Techniques for Medical Non-wovens (USA, 2004)	Study was conducted demonstrating a 99.6% reduction in microorganisms on medical non-woven textiles treated with AEGIS after several washings.
Ronald McDonald House (Canada)	Study was conducted demonstrating over 99% reduction in microbes on surfaces treated with AEGIS.
Determination of Antibacterial Activity of Shield Sprayed Polypropylene Against E. Coli and Staph. (Ireland, 2018)	Study conducted using ISO 22196:2011 demonstrated a >99.99% reduction in bacteria on treated surfaces.
Antimicrobial Effects of AEGIS on E.Coli (Canada, 2013)	Study conducted by Western University demonstrated reducing in microbial growth on treated surfaces from 91% to 100%.
Determining the Antimicrobial Activity of Immobilized MRSA (USA)	Study demonstrated that surfaces treated with AEGIS reduced the presence of MRSA by 99.9%.
Closing the Gap Healthcare (Canada, 2019)	2-month field study showed a reduction in surface microorganisms of up to 94.5% on treated surfaces.
Oshawa Clinic (Canada, 2019)	2-week field study showed a reduction in surface microorganisms of an average 92.7% on treated surfaces.
Street-car Transit Vehicle Antimicrobial Study (Canada, 2010)	10-month study demonstrated that surfaces treated with AEGIS had a 1 to 2 log reduction in comparison to untreated surfaces in extreme high traffic environments.

The completed case studies are available upon request. Additional studies are available based on the industry of interest.



The antimicrobial properties of AEGIS® have been documented in many white papers and medical textbooks including *AEGIS® Efficacy on Medical and Healthcare Textiles* (Subhash C. Anand, J F Kennedy, M Miraftab, S. Rajendran)

4 Approvals

AEGIS® is manufactured by AEGIS Environmental Management Inc. and owned by Microban. AEGIS® and AEGIS Microbe Shield® are trademarks of Microban International. PROTECT Technologies is the global master distributor of AEGIS Microbe Shield®. Bactraban is the master distributor in South Africa. The biocidal active components of AEGIS® are notified with the EU Biocidal Products Regulation (BPR) and registered with the US Environmental Protection Agency (EPA) and Health Canada Pest Management Regulatory Agency (PMRA).

- US Environmental Protection Agency: 64881-1 & 64881-7
- Health Canada: PCP# 15133
- European Union: AEGIS® is listed as PT-7 and PT-9 with the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) and as PT-2 in the United Kingdom.

5 Attributes of AEGIS Microbe Shield®

Some attributes of AEGIS Microbe Shield® include:

Non-toxic	No odour	No Volatile Organic Compounds
Non-leaching	No colour	Not triclosan-based
Non-transferring	No off-gassing	Cannot be felt by touch
Non-flammable	No heavy metals	Has hydrophobic qualities

6 Disinfection Protocols

Provincial Infection Control Network of British Columbia (PICNet)

Well-established disinfection protocols exist such as those published by PICNet. The following information has been provided by PICNet, the Provincial Infection Control Network of British Columbia.

Current disinfection protocols will be effective if they are diligently carried out and properly performed using friction (scrubbing) and conscientious cleaning of patient-care surfaces (e.g. bed rails), and frequently touched surfaces (e.g. hallway handrails), at least once daily.

Processes for cleaning and disinfection should include a selection of hospital-appropriate solutions; the correct technique to remove soil; sufficient contact time for disinfectants; and the appropriate concentration of solutions used.

The protocols that are in place should be current best practices. However, there are several variables in these protocols which contribute to challenges of disinfection of surfaces such as those identified in the points above.

The addition of the AEGIS Microbe Shield® to established disinfection protocols has the potential to add significant protection against the growth of harmful microbes between disinfection times.

PICNet
PROVINCIAL INFECTION CONTROL NETWORK OF BRITISH COLUMBIA
A program of the Provincial Health Services Authority

7 Testimonial – Infection Control and Prevention

Reiner, Sandra

From: Reiner, Sandra
Sent: Wednesday, September 24, 2003 9:39 AM
To: kstrong@aegis-incanada.com
Subject: AEGIS® use at Northwestern Memorial Hospital

Greetings Kim,

The purpose of this memo is to respond to your request for a brief history of our use of AEGIS at Northwestern Memorial Hospital (NMH) in Chicago. We believe that the application of AEGIS compound has played a positive role in controlling airborne communicable infectious diseases at NMH.

We first learned about AEGIS from one of the leaders in our Facilities Management Department during an Aspergillus prevention task force project. We were in the process of altering an existing (45+ yr. old building) facility to house a bone marrow transplant patient population.

In order to accomplish the alterations to the facility, we had to move units to temporary quarters while construction was under way. Application of AEGIS® compound was recommended for use in the temporary units. We believe that AEGIS compound contributed to the safety of our bone marrow transplant patients during all the moving around and construction. Particle counts in the temporary units were indicative of adequate particulate control and there were no cases of nosocomial aspergillosis. Since our first "contact" we have used AEGIS® applications for:

- Construction projects on existing facilities
- Finish application of all surfaces (ceilings to floors) In high-risk patient care areas
- Preservation of mould following water damage to facilities (after demolition, standard cleaning and drying)
- Application to surfaces in temporary quarters for high-risk patients (again)

Although we do not have regularly scheduled reapplication, I'd like to consider this an option for our highest risk patient care areas.

I hope this is helpful. If you have questions or require additional information please feel free to contact me any time.

Thank you for your patience.

Regards,

Sandra Reiner
Infection Control and Prevention
Northwest Memorial Hospital
Galter Pavilion Suite 3-210
Chicago, IL 60611
312-926-0564

Northwestern Medicine®

8 Summary of Recent Healthcare Projects in Southern Ontario, Canada

PROTECT is not aware of all AEGIS® application projects completed by their licensed applicators in healthcare. The following is a partial list of AEGIS® application projects in healthcare that were either completed by PROTECT directly or where PROTECT supported a licensed applicator.

Hospital Summary

- Windsor Regional Healthcare (Windsor)
- Hotel Dieu (Windsor)
- Metropolitan Hospital (Windsor)
- St. Michaels Hospital (Toronto)
- Royal Victoria Hospital (Barrie)
- William Osler Hospital (Brantford)

Long-Term Care, Supported Living and Clinics

- Alderbrain Attendant Care (Toronto)
- Loyola Aruupe Centre for Seniors (Toronto)
- Bridle Manor Co-operative (Scarborough)
- Closing the Gap Healthcare (Mississauga)
- Oshawa Clinic (Oshawa)
- Dialysis Clinic (Ontario)

9 Partial List of AEGIS® Efficacy Against Specific Microorganisms

AEGIS® has been tested to be effective at controlling and preventing the growth of a wide variety of micro-organisms including the following. The microorganisms listed should be viewed as representative of the types of organisms against which AEGIS® technology is effective, rather than as a comprehensive list. Commonly requested microorganisms are highlighted.

Bacteria
Micrococcus sp.
Staphylococcus epidermidis1
Enterobacter agglomerans1
Acinetobacter calcoaceticus1
Methicillin-resistant staphylococcus aureus (MRSA)
Staphylococcus aureus(pigmented)1
Staphylococcus aureus (nonpigmented)1
Klebsiella pneumoniae ATCC 4352
Pseudomonas aeruginosa
Pseudomonas aeruginosa PRD-10
Strepticoccus faecalis
Pseudomonas aeruginosa1
Escherichia coli ATCC 23266
Escherichia coli1
Proteus mirabilis
Citrobacter diversus1
Salmonella typhosa
Proteus mirabilis1
Salmonella choleraesuis
Corynebacterium bovis
Mycobacterium smegmatis
Mycobacterium tuberculosis
Bruncella cania
Brucella abortus

Bacteria Continued
Brucella suis
Streptococcus mutans
Bacillus subtilis
Bacillus cereus
Clostridium perfringens (C. Diff.)
Haemopilus influenzae
Haemophilus suis
Lactobacillus casei
Leuconostoc lactis
Listeria monocytogenes
Propionbacterium acnes
Proteus vulgaris
Pseudomonas cepacia
Pseudomonas filluorescens
Xanthomonas campestris

Fungi
Aspergillus niger
Aspergillus fumigatus
Aspergillus versicolor
Aspergillus flavus
Aspergillus terreus
Penicillium chrysogenum
Penicillium albicans
Penicillium citrinum
Penicillium elegans
Penicillium funiculosum
Penicillium humicola

Fungi Continued
Penicillium notatum
Penicillium variabile
Mucor sp.
Tricophyton mentagrophytes
Tricophyton interdigitalie
Trichoderma flavus
Chaetomium globusum
Rhizopus nigricans
Cladosporium herbarum
Aureobasidium pullulans
Fusarium nigrum
Fusarium solani
Gliocladium roseum
Oosopa lactis
Stachybotrys chartarum

Algae
Oscillatoria borneti LB143
Anabaena cylindrica B-1446-1C
Selenastrum gracile B-325
Pleurococcus sp. LB11
Schenedesmus quadricauda
Gonium sp. LB 9c
Volvox sp. LB 9
Chlorella vulgarus

Yeast
Saccharomyces cerevisiae
Candida albicans