

# Germ Shield – Antimicrobial Coating ( EPA registrations and FDA listings )

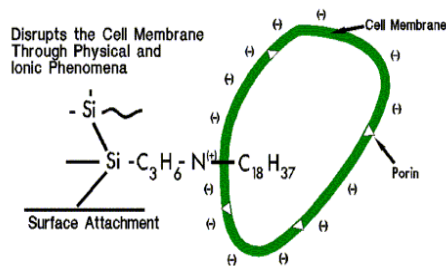
## SARS Decontamination by Germ Shield

The major differences between *Germ Shield* and other conventional antimicrobials is that the *Germ Shield* Technology:

1. IS NOT absorbed or consumed by the microbe, which in turn allows for the treatment to remain at full-strength for essentially the life of the surface/product.
2. Is a bound antimicrobial which means that it molecularly bonds to a surface. This bond does not allow any leaching of treatment onto other surfaces and does not allow for the development of adaptative organisms.
3. WILL NOT volatilize (off-gas).
4. Is **EPA registered** for all interior surface with **FDA listing**.
5. Has a 30-year history of durability, effectiveness, and safety.



**Disrupt the Cell Membrane Through Physical and Ionic Phenomena**



The *Germ Shield* Technology utilizes a unique chemistry. As depicted in the graphic above, microorganisms carry a negative charge while Germ Shield carries a positive charge. This creates an "electromagnetic" attraction between the microbe and Germ Shield draws the microbe to the treated surface. Once contact is made, the microbe is stabbed by the Germ Shield molecule, is "electrocuted" and dies instantly.

The Germ Shield Program is based on technology developed by Dow Corning Corporation in close cooperation with Baxter HealthCare, Burlington Industries and a number of major textile, medical products, carpeting, and carpet fiber companies in the United States, Europe, Australia, Japan and Korea. The results of their collective work show a remarkable product which, when properly reacted onto surfaces, makes these surfaces resistant to fungal, bacterial, algal and virus growth. EPA registrations and FDA listings allow us and our customers a wide range of end uses that take advantage of the safety profile, durability and broad spectrum activity.



### Global Support

USA EPA: Registered

Europe EINECS: Registered

China FDA: Registered

Canada PMRA: Registered

Listed on Oko-Tex's "Accepted Active Chemical Products"



Customer Hotline: 852-34210167

## Decontamination Works:



### *SARS Decontamination by Germ Shield*

#### Environmental Assessment

The work area should be unoccupied. Vacating people from spaces adjacent to the work area/floor is necessary. (For Peace of Mind) The presence of contaminants should be addressed immediately. In all instances, all entry and excess to the premises should be limited to the decontaminating crew with proper safety suit, gear and full-face masks.

The recommend process will ensure that a premise is thoroughly decontaminated to its best possible resources available in Singapore.

#### Plan 1: SARS Suspect Only:

Decontamination of premises using fogging system. All Biocide, virucide and bactericide are EPA (USA) registered.

#### Plan 2: SARS Confirmed.

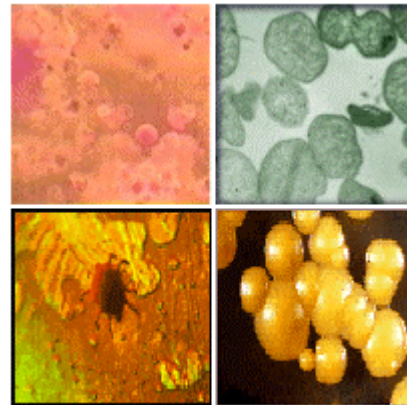
- 1 · Decontamination of premises using fogging system. Wiping down all surfaces up to 6 ft with biocide, virucide and bactericide.
- 2 · Entire area surface is decontaminated using biocide and only disposable material is used to prevent cross contamination during surface decontamination
- 3 · Attached with air scrubber with UV light and HEPA system.

#### Plan 3: Multiple SARS Cases Confirmed.

- 1 · All Air Handling Units in the affected floor should be turnoff to prevent short-circuiting.
- 2 · All entry and exit should be sealed with 0.20-mm plastic sheeting.
- 3 · Air Scrubber is placed with UV capability to run continuously during decontamination process.
- 4 · Air Blowers with plastic tubing to flush the present air out of the indoor environment to create Negative Pressure Isolation Rooms reducing short circuiting within floors/rooms thus keeping contaminants and pathogens from reaching surrounding areas.
- 5 · They will be fogged with a biocide to ensure eradication of any air borne contaminate if any.
- 6 · Entire area surface is decontaminated using biocide and only disposable material is used to prevent cross contamination during surface decontamination.
- 7 · Equipment such as particulate weight and count are running to ensure the reduction of air borne particulate.
- 8 · To decontaminate the entire AHU with Biocide and change all disposal filter treated with Germ Shield.
- 9 · The air-handling unit is turn on and air sterilizes.
- 10 · All surface are treated with Germ Shield..



The following list has been prepared in response to numerous requests for a “list” of the microorganisms against which the technology is effective. The organisms shown are ones against which the technology has been specifically tested. Germ Shield are considered to be “broad spectrum” antimicrobials. That means that they are effective against a very wide range of microorganisms (fungi, gram(+) and gram(-) bacteria, yeasts, algae and Virus). The microorganisms listed should be viewed as representative of the types of organisms against which the **Germ Shield** technology is effective, rather than as a comprehensive list.




---

#### **BACTERIA:**

|                                                      |                            |                                   |
|------------------------------------------------------|----------------------------|-----------------------------------|
| Micrococcus sp.                                      | Mycobacterium smegmatis    | Escherichia coli <sup>1</sup>     |
| Stapylococcus epidermidis <sup>1</sup>               | Mycobacterium tuberculosis | Proteus mirabilis                 |
| Enterobacter agglomerans <sup>1</sup>                | Brucella cania             | Citrobacter diversus <sup>1</sup> |
| Acinetobacter calcoaceticus <sup>1</sup>             | Brucella abortus           | Salmonella typhosa                |
| Stapylococcus aureus(pigmented) <sup>1</sup>         | Brucella suis              | Proteus mirabilis <sup>1</sup>    |
| Stapylococcus aureus<br>(non-pigmented) <sup>1</sup> | Streptococcus mutans       | Salmonella choleraesuis           |
| Klebsiella pneumoniae ATCC 4352                      | Bacillus subtilis          | Corynebacterium bovis             |
| Pseudomonas aeruginosa                               | Bacillus cereus            | Propionbacterium acnes            |
| Pseudomonas aeruginosa PRD-10                        | Clostridium perfringens    | Proteus vulgaris                  |
| Streptococcus faecalis                               | Haemophilus influenzae     | Pseudomonas cepacia               |
| Pseudomonas aeruginosa <sup>1</sup>                  | Haemophilus suis           | Pseudomonas filluorescens         |
| Escherichia coli ATCC 23266                          | Lactobacillus casei        | Xanthomonas campestris            |
|                                                      | Leuconostoc lactis         | Listeria monocytogenes            |

#### **FUNGI:**

|                         |                            |                         |
|-------------------------|----------------------------|-------------------------|
| Aspergillus niger       | Penicillium funiculosum    | Rhizopus nigricans      |
| Aspergillus fumigatus   | Penicillium humicola       | Cladosporium herbarum   |
| Aspergillus versicolor  | Penicillium notatum        | Aureobasidium pullulans |
| Aspergillus flavus      | Penicillium variabile      | Fusarium nigrum         |
| Aspergillus terreus     | Mucor sp.                  | Fusarium solani         |
| Penicillium chrysogenum | Tricophyton mentagrophytes | Gliocladium roseum      |
| Penicillium albicans    | Tricophyton interdigitalie | Oosopa lactis           |
| Penicillium citrinum    | Trichoderma flavus         | Stachybotrys atra       |
| Penicillium elegans     | Chaetomium globusum        |                         |

#### **ALGAE:**

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

#### **YEAST:**

|                          |                  |  |
|--------------------------|------------------|--|
| Saccharomyces cerevisiae | Candida albicans |  |
|--------------------------|------------------|--|

---

## ***Germ Shield*** - Quick Kill and Long Term Protection

Interpretive Note: Although the list of microorganisms against which a biocide has been shown to be effective is important for determining whether or not the material can be used against specific types of organisms, it is only the starting point. Killing or controlling microorganisms (particularly in laboratory test of the active ingredient) is relatively easy. Doing it safely, doing it in real world situations, doing it without ruining the target surface, and selecting between a quick kill and long term protection are generally much more important.

There are many materials and processes which can kill microorganisms quickly and effectively. Common household bleach (chlorine) is an excellent biocide. Unfortunately, bleach cannot be used on many surfaces, has no lasting antimicrobial effect,

and can be very dangerous if used improperly. Extreme heat is also highly effective, but you can't put a sick building in an autoclave. Other materials are efficient at high concentrations, but have little effect at dilution levels which would be required to insure human safety. Finally, some materials are so inherently dangerous that they can only be used in isolation chambers or by professional applicators using respirators and "space suits". The "killing power" of a biocide or device is important, but only if the material is used in strict accordance with EPA accepted handling and use instructions and for the end uses included in the EPA accepted labeling. Misuse of any biocide is not only illegal, it can be extremely dangerous.

Any reputable supplier should be willing to provide copies of the EPA accepted labeling, copies of toxicity data and data on real world efficacy.

---

## ***Germ Shield*** - AEM 5700 offers users the following features

Good durability - In the presence of moisture, AEM 5700 antimicrobial agent imparts a durable, broad spectrum, biostatic surface finish to a wide range of substrates. It is leach resistant, non-migrating, and is not consumed by microorganisms. Broad spectrum activity - Effective against gram positive and negative bacteria, fungi, algae, yeasts and virus.

Increased efficiency - Through proper application, durable bacteriostatic and fungistatic and algistatic surfaces can be attained with a minimum amount of Dow Corning 5700 antimicrobial agent.

AEM 5700 antimicrobial agent can be applied to organic or inorganic surfaces as a dilute aqueous solution to give 0.1-1.0 percent by weight of active ingredients. Aqueous solutions can be prepared by simply adding the antimicrobial agent to water while stirring.

Surfaces can be treated with the aqueous by dipping, padding, or by automated spraying until adequately wet, or applying by foam finishing techniques.

After applying the antimicrobial agent, the surface should then be dried to effect complete condensation of

silanol groups at the surface and to remove water and/or traces of methanol from hydrolysis. Optimum application and drying conditions such as time and temperature should be determined for each application before use in a commercial process.

The first commercial application, on men's socks, helped prevent microbially caused deterioration and defacement and reduced sock odor associated with the proliferation of microorganisms. A paper by Gettings and Triplett presented conclusive evidence that the antimicrobial feature provided a significant reduction in sock odor and that the protection afforded by the treatment was not significantly diminished even after repeated launderings.<sup>27</sup> Mechanisms of attachment to surfaces, general treatment phenomena, and performance profiles have also been previously presented by Malek and Speier and will not be detailed in here.

AEM 5700 is registered with the EPA - USA for use as a pesticide on numerous substrates. This chemistry has also been reviewed by the F.D.A. and is listed as a modifier of medical devices under the 510(k) procedures.