

Advanced

# Antimicrobial Agent



Hospitals and  
Medical Areas



Office  
Buildings



Homes



Restaurants



Schools and  
Universities

## Notes:

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### an·ti·mi·cro·bi·al

Pronunciation: "ant-i-mI-"krO-bE-&l"

Variant: an·ti·mi·cro·bic /-'krO-bik/

Function: Adjective

Destroying or inhibiting the growth of microorganisms

### mi·cro·or·gan·ism

Pronunciation: -'or-g&-"niz-&m"

Function: Noun

Any organism too small to be viewed by the unaided eye, as bacteria, protozoa, fungi and algae.

# The Tile Doctor Shield Difference.

Quality. Safety. Durability. Effectiveness.

## Quality

- Easy to clean and maintain
- Eliminates need for harsh cleansers
- Keeps surfaces cleaner, longer
- Registered and available worldwide
- Prevents deterioration of surfaces due to microbial contamination

## Safety

- No VOC's
- Does not leach
- Does not rub off or migrate onto the skin
- No heavy metals, silver, arsenic, or polychlorinated phenols
- Safe enough to wear
- More than 30 years of effective use

## Durability

- Single application lasts for months
- Covalent bonding to surface
- Easy to apply
- Cross-linking for maximum effectiveness

## Effectiveness

- 99.9% Kill log
- Effective against objectionable odors and stains due to microbial growth

# Shield Means Protection

## Part of the Green Equation



In use as well as in development, Shield can be an active part of a corporate sustainability strategy. A recent CNN.com study showed that consumers are willing to pay a premium for products that are renewably sourced, but Shield has a much deeper green story.

### Reduce, Reuse, Recycle

Nothing is less environmentally friendly than our disposable culture, and perception is as critical as reality. Microbes can wreak havoc on the appearance and functionality of any durable good, leading to premature erosion of the product. Staining and odors from microbes leave the perception of lost utility long before the product is actually ready for disposal. Functionally enhanced microbial protection can give products a longer, more useful life, so it can be reused or recycled.

### Indoor Air Quality

VOC's, or volatile organic compounds, are a critical component of LEED Certifications for indoor air quality. Shield contains no VOC's, and initial testing indicates a positive effect on indoor air quality.

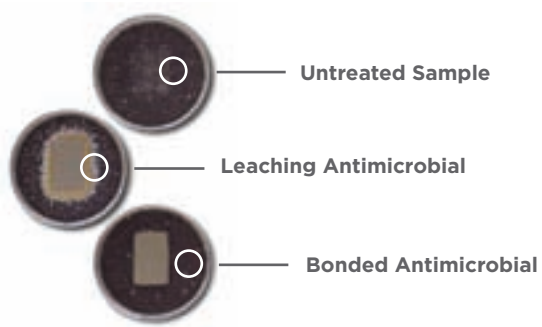
### Cradle to Cradle Accountability

Sustainability should be considered from every aspect of sourcing, manufacturing, transportation, use, disposal and recyclability. Many antimicrobials leach into the water, creating harmful effects for waste water or run-off, and have been negatively recognized for their impact on fish and other wildlife.

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## Just a Few of the Globally Recognized Brands Using Shield Technology





## Non-Leaching

Shield is a bonded antimicrobial which means it controls the growth of microorganisms without the use of chemical toxins. Competing technologies use heavy metals, silver, triclosan or other leaching chemistries that emit low doses of toxins in order to be effective. Furthermore, once the supply of chemicals is used up, there is diminishing return on the efficacy.

## Physical Elimination of Microbes

In contrast to a leaching technology, Shield provides a mechanical mode of antimicrobial protection. This means there is a physical rupturing of the microbe's cell membrane on direct contact, rather than by poisoning. Shield draws the average microbe (3 microns wide) onto a surface with magnetic force, rupturing the cell wall with the equivalent of 25,000 spears. The modified surface becomes inhospitable to a broad spectrum of bacteria, algae and fungi. There is no chemical to be consumed by microbes - or by humans. It does not dissipate or become depleted and allows continual control of microbial growth over time. The antimicrobial will be fully effective as long as the surface remains intact.

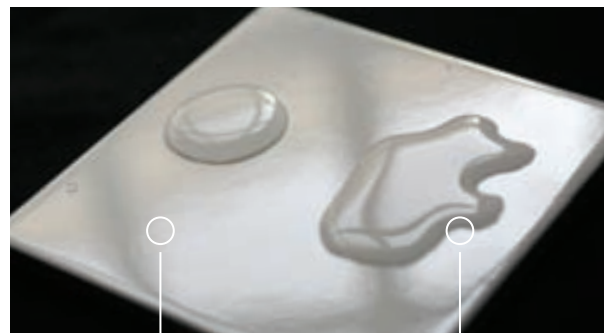


## Long-term Effectiveness

Adding to Shield's safety profile is its characteristic of covalently (permanently) bonding to surfaces, allowing for residual protection long after the initial application. This allows for a protected environment long after traditional antimicrobials or sanitizers have ceased working. The use of Shield allows surfaces to be protected in between routine cleaning.

## Virtually self-cleaning

The Shield can make a surface hydrophobic (water repelling) which means your surface is much easier to clean and with simply application of running water virtually cleans itself. The protected surface releases stains, and prevents hard water and soap scum deposits. Those surfaces can be maintained with simple soap and water, therefore allowing fewer toxic chemicals to go down the drain through a cleaning process.



TTD Treated Sample

Untreated Sample

# History of the Tile Doctor Shield Molecule

## History

Dow Corning Corporation, the largest supplier of silicone and silane chemicals in the world, began a pure research program in the late 1960's aimed at determining if they could utilize organofunctional silanes as pesticides. They asked: "Could pesticides now be made that would not migrate into the environment by leaching or volatilizing by tying them to target surfaces with a silane?" The outcome would be safer, more efficient, and more effective products.

A large variety of formulations were tested. These included a host of herbicides, insecticides, fungicides, and bactericides. The screening tests included standard ASTM protocols, and a variety of toxicological and environmental impact reviews. Out of this work came several antimicrobial patents, and brought the most promising materials into commercialization, complete with EPA registrations. From the inception of the program, Dow Corning maintained strict confidentiality on the formulation and processing of the technology. They still manufacture the product with trade secrets that have prevented competition from duplicating the quality, safety and efficacy of the product.

## Scientific Validation

Important in this time frame was the publication of several validating technical papers by respected chemists and microbiologists outside of the Dow Corning network. These peer reviews confirmed the quality of the data, the uniqueness of the discovery, and granted Dow Corning, Industrial Research magazine's prestigious IR-100 Award for this technology. The significance of these publications is that noted scientists in these respected disciplines reviewed the work, recognizing the merit of this new and unique technology and allowed such publications to be printed as scientific fact.

## Commercialization and Real World Experience

Commercialization of Dow Corning technology began in 1976 after receiving EPA registrations. Years of research by outside laboratories, and Dow Corning verified the safety and utility of this technology on direct human contact goods such as textiles. Early on, Burlington's Bioguard-brand socks revolutionized the marketing of the product and proved usefulness in real life consumer application. Consumers have been wearing the technology in skin contact applications ever since.

## Imitators

By the late 1980's, several companies began attempts to manufacture "me-too" products. Although they've managed to register similar chemical compounds, they've been unable to match the performance, cross linking, and stability of the molecule that make it so effective. In fact, most can be easily removed with everyday household chemicals and others have stability issues and have a tendency to discolor surfaces.

To expand, Dow Corning invested more than 10 years on many formulations and settled with this one technology and its exact molecular design and has been field tested for more than 30 years. The chain of molecules is precisely formulated for maximum effectiveness and highest durability.

## Creation of Shield

Early in the 2000's, a team of fired ceramics and natural stone experts, led by tile industry veteran Curt Rapp of the Tile Doctor, were introduced to the imitators of the Dow Corning chemical. Through vigorous testing, the team uncovered the limitations inherent to the imitation technologies.

In 2008, Rapp was introduced to the Dow Corning molecule. In 2009, Silver Cornia, a recognized R&D expert to the tile industry, joined the Tile Doctor team and perfected the application of the time-tested antimicrobial on fired ceramics and natural stone. Rigorous testing ensued for efficacy, performance, and durability, as well as effects on COF and PEI abrasion. The chemical was also considered for true measures of green and sustainability. The technology and its application method have been perfected; however it remains the same basic product that other leading companies regard as the safest, most durable solution available for safe and effective microbial control. In June of 2009, Tile Doctor Shield received all international regulatory approvals for worldwide distribution.

## Representative Microorganisms Tested: A Partial Compendium

### Interpretive Note:

Although a list of microorganisms against which a biocide has been shown to be effective is important for determining whether or not it may be used against specific types of organisms, it is only the starting point. Killing or controlling microorganisms (particularly in laboratory tests of the active ingredient) is relatively easy. Safety to man and the environment, cost effective use in real world situations, avoidance of the creation of resistant organisms, long term efficacy, potential damage to treated surfaces, and many other factors are normally much more important.

Finally, the use of biocides is strictly regulated in the United States. Biocides must be used in strict accordance with Environmental Protection Agency (EPA) accepted handling and use instructions and only for those end uses included in EPA accepted labeling. Misuse of a biocide may be dangerous. It is also illegal.

The Tile Doctor Shield Program is based on a unique antimicrobial technology which effectively controls bacteria, fungi, algae and yeasts on a wide variety of treated articles and substrates. The antimicrobial active is registered with the U.S. Environmental Protection Agency and comparable regulatory bodies around the world. The antimicrobial has been used safely and effectively for more than thirty years.

This sheet has been prepared in response to numerous requests for a list of microorganisms against which the technology is effective. The list shows specific organisms which have been tested against the technology. They were selected to provide a test spectrum which is representative of all significant types and varieties of microorganisms.

These data are provided solely to assist you in understanding the capabilities of the technology and are not a warranty. Laboratory testing is performed in a controlled environment and may or may not be representative of real world conditions. Effectiveness against an organism should not be interpreted as eliminating, controlling, minimizing or otherwise affecting health conditions which may be associated with specific organisms.

### Bacteria

*Micrococcus* sp.  
*Mycobacterium smegmatis*  
*Staphylococcus epidermidis*<sup>1</sup>  
*Mycobacterium tuberculosis*  
*Enterobacter agglomerans*<sup>1</sup>  
*Brucella cania*  
*Acinetobacter calcoaceticus*<sup>1</sup>  
*Brucella abortus*  
*Staphylococcus aureus* (pigmented)<sup>1</sup>  
*Brucella suis*  
*Staphylococcus aureus* (non-pigmented)<sup>1</sup>  
*Streptococcus mutans*  
*Klebsiella pneumoniae* ATCC 4352  
*Bacillus subtilis*  
*Pseudomonas aeruginosa*  
*Bacillus cereus*  
*Pseudomonas aeruginosa*<sup>1</sup>  
*Clostridium perfringens*  
*Clostridium difficile*  
*Pseudomonas aeruginosa* PDR-10  
*Haemophilus influenzae*  
*Streptococcus faecalis*  
*Haemophilus suis*  
*Escherichia coli* ATCC 23266  
*Lactobacillus casei*  
*Escherichia coli*<sup>1</sup>  
*Leuconostoc lactis*  
*Proteus mirabilis*  
*Listeria monocytogenes*  
*Proteus mirabilis*<sup>1</sup>  
*Propionibacterium acnes*  
*Citrobacter diversus*<sup>1</sup>  
*Proteus vulgaris*  
*Salmonella typhosa*  
*Pseudomonas cepacia*  
*Salmonella choleraesuis*  
*Pseudomonas fluorescens*  
*Corynebacterium Boris*  
*Vancomycin Resistant enterococci*  
*Xanthomonas campestris*  
*Methicillin Resistant Staphylococcus aureus*

### Fungi

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

### Algae

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

### Yeast

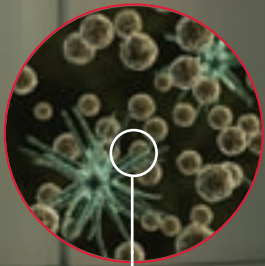
*Saccharomyces cerevisiae*  
*Candida albicans*

(<sup>1</sup>Clinical isolates)

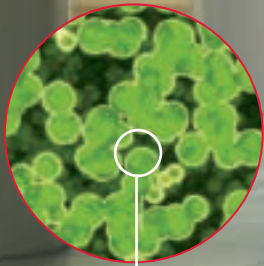
TILE DOCTOR  
**SHIELD**  
ADVANCED ANTIMICROBIAL AGENT



Antimicrobial protection against:



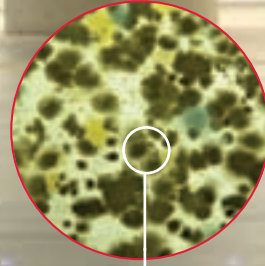
**Bacteria**



**Algae**



**Fungi**



**Mold**



**Mildew**

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