



## Antimicrobial Tile: An Overview

**W**hether at home, work, or school, a healthy and hygienic environment is important and highly desirable. Microbes and germs are a daily threat, and the control of microbial growth and contamination is a critical step towards a healthier environment.

Most microbes happily settle on solid surfaces, and their subsequent growth and accumulation lead to the formation of complex communities known as biofilms. Biofilms act as a landing place for more microbes leading to larger and potentially more harmful microbial colonies which can cause damage to structures. The damage or “fouling” from these microbes could range from discoloration or bad odor to corrosion. Biofilms can also attract more dangerous microbes that can cause serious infections and diseases.

Antimicrobial tile and tile coatings,

which are relatively new to the marketplace, can provide an efficient defense against microbes.

### **Q: What does antimicrobial mean?**

**A:** As an industry professional or as a consumer, it is very important to understand such terms. According to

the Environmental Protection Agency (EPA), antimicrobial products are substances or mixtures of substances used to destroy or suppress the growth of harmful microorganisms such as bacteria, viruses, or fungi on inanimate objects and surfaces. Antimicrobial tiles disinfect, sanitize, reduce, or mitigate growth or development of microbes while protecting surfaces from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.

The EPA classifies antimicrobial products as public health products if they control microbes which cause infections in humans and animals and as non-public health products if they only control microbes which cause infections in animals. Public health products are further classified as sterilizers, disinfectants and sanitizers based on their percentage of killing action, which varies from 98% -100%.



**Right: Most microbes happily settle on solid surfaces, and their subsequent growth and accumulation lead to the formation of complex communities known as biofilms, which can lead to larger and potentially more harmful microbial colonies to form.**

**Q: How do antimicrobial tiles and tile coatings work?**

**A:** Microbial contamination can be easily controlled on tile by normal cleaners, which act as disinfectants. However, once the disinfectant is removed, contamination can recur. Active antimicrobial surfaces can provide continuous antimicrobial efficacy throughout the day to help inhibit the spread of bacteria and other microbes. Antimicrobial tile and tile coatings require three ingredients: an active ingredient, a carrier for that active ingredient, and a mechanism to release

**Antimicrobial tile and tile coatings require three ingredients: an active ingredient, a carrier for that active ingredient, and a mechanism to release the active ingredient from the carrier.**

the active ingredient from the carrier. Most commonly used active ingredients are quaternary ammonium salts, metal ions (such as silver, zinc, or titanium), triclosan and other bacteriostatic and fungistatic chemicals.

**Q: How are antimicrobial tiles made?**

**A:** The active ingredient and carrier are often applied as a glaze during the tile manufacturing process. Once the tile is coated with the antimicrobial product, the firing of the glaze fixes the coating onto the tile surface. Alternatively, antimicrobial tile coatings are available that can be applied on tiles by trained

installers and in some cases by the consumer.

**Q: What is the advantage of antimicrobial tiles?**

**A:** Strong worldwide population growth points to the importance of more infection control in restaurants,

public transportation systems, shopping areas, hospitals, and other public areas. The importance of clean, bacteria-free environments cannot be underestimated, and to ensure this, the highest standards in prevention are critical. Substituting antimicrobial tiles for other surfaces supports a healthier environment.

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## Q: What is the efficiency and durability of antimicrobial tiles?

**A:** Various test methods are available to test the efficiency of antimicrobial tiles. Tile Council of North America (TCNA) runs *ISO 22196 (Measurement of antibacterial activity on plastics surfaces – modified for ceramic services)* and *ISO 27447 (Test method for antibacterial activity of semiconducting photocatalytic materials)* to test for antibacterial activity. TCNA also offers *ASTM G-21 (Standard practice for determining resistance of synthetic polymeric materials to fungi)* for testing against different molds.

Traditionally a tile surface is regarded as durable and easy to clean. The durability of antimicrobial tiles can be determined by doing a simple abrasion test preceded and followed by the aforementioned antimicrobial testing. TCNA can provide *ASTM C1027 (Standard test method for determining visible abrasion resistance of glazed ceramic tile)* testing in conjunction with scanning electron microscope (SEM) imaging to detect removal of the antimicrobial coating.

## In Conclusion

Although antimicrobial tile products are fairly new to our industry, with the growing concern about general health and hygiene, the use of such products is expected to grow. By its nature, tiles contribute to good air quality and create healthy and hygienic surfaces; antimicrobial qualities are yet another feature to consider when choosing floor and wall coverings and a benefit that ceramic tiles can provide. **TILE**



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## About the Authors

Eric Astrachan, Executive Director of the TCNA, Inc., has 34 years experience in international business with the past 16 years in the ceramic tile industry in manufacturing, installation, research, and association management. Presently, he is chairman of the TCNA Handbook Committee,

Co-Secretary of the ANSI (American National Standards Institute) Accredited Standards Committee A108, and Head of Delegation representing ANSI's vote in ISO TC-189 (International Organization for Standardization Technical Committee on ceramic tiles).

Additionally, he is a member of the Board of Directors for the Ceramic Tile Education Foundation, the Board of the Responsible Solutions for Mold Coalition, and the Board of Governors of the international trade show Coverings.

Dr. Jyothi Rangineni is a Research Scientist at Tile Council of North America. She is responsible for research and development of new testing standards for TCNA members and TCNA's Product Performance Testing Laboratory. Dr. Rangineni has over 10 years experience in research and experimental design in Microbiology.