



## The down and not-so-dirty truth about ceramic tile and microbes

By Jennifer Ariss

**W**ith swine flu and flesh-eating MRSA bacteria in headline news, microbes are in the limelight reminding us all that we are surrounded by bacteria, mold and viruses. It's true, microbes or what the public affectionately terms "germs" are on us, in us and on everything we touch. Knowing that, who wouldn't want surfaces that are cleaner, more sanitary and healthier?

Classic applications of ceramic tile have included wet areas and areas requiring high levels of sanitation, such as baths and kitchens. These types of areas have all the criteria needed for growing microscopic gardens of fungi and bacteria because of obvious reasons, like high moisture and increased surface contami-

nation from food and human contact. In this article, we will look at the facts about what (still) makes ceramic tile installations the best choice of surfaces in fighting the war on "germs."

### **Q: Do ceramic tile assemblies support microbial growth?**

**A:** The truth is they don't or at least not well. Fungi (mold and mildew) and bacteria need a food source to grow, usually carbohydrates. Ceramic tile itself cannot provide this food source as it is inorganic and inert. Yet, we have all seen mold growing in our showers. This is usually due to organic residues from our bodies, soaps and cleaners that provide enough of a food base for the fungus to grow. As for bacteria present on ceramic tile, they

**Above: Microscopic image of a common mold found in homes.**

are usually just hanging out on the surface and will die when the surface dries or they starve to death. As for assembly materials such as backer boards, membranes, grouts and adhesives, they may support some microbial growth depending on the substrate. Cementitious materials are generally inhospitable to most microbes because of the high pH

(alkalinity) of the substrate. However, proper installation and choice of setting materials that keep the backing materials dry eliminates sources of free moisture that are necessary for bacteria and fungi to survive and grow.

ANSI Specifications for the Installation of Ceramic Tile includes physical property requirements for assembly materials that include fungal and bacterial resistance tests. ANSI specifications for Cementitious Backer Units (A118.9) require materials to pass ASTM G22 *or* ASTM E2180 **and** ASTM G21. ANSI specifications for Waterproof Membranes (A118.10), Crack Isolation Membranes (A118.12), and Organic Adhesives (A136.1) include test procedures that require these materials to not support the growth of fungi using a known test fungus.

Most assembly materials generally make poor substrates for microbes to grow on, if they can survive for any period of time at all. Additionally, many manufacturers are now incorporating antimicrobial additives for further insurance against the growth of these unwanted guests.

**Q: What does “antimicrobial” mean when a product makes this claim?**

**A:** Ahh, this is a slippery slope where microbiology meets marketing. The term “antimicrobial” is a general term that refers to the ability of a substance to resist, retard, or in some cases, destroy microbes. This has a variety of biological implications. It may mean a microbe cannot grow or cannot reproduce in the presence of the antimicrobial agent but it may not kill the organism outright. The Environmental Protection Agency (US EPA) has stringent efficacy testing requirements for certain classes of antimicrobial compounds that actually fall under regulation as antimicrobial pesticides. This typically applies to disinfecting products meant to be applied to surfaces, which is generally not relevant to most ceramic tile products or related assembly materials.

For the purposes of our industry, another EPA classification of regulation applies that is referred to as “consumer products treated with antimicrobial pesticides.” This refers to the incorporation, impregnation or surface application of an antimicrobial compound. Strict federal regulations apply to the claims that can be made about such products and prohibit claims of public health uses. For

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more information, the EPA maintains a consumer website on such regulation ([www.epa.gov/pesticides/factsheets/treatart.htm](http://www.epa.gov/pesticides/factsheets/treatart.htm)).

**Q: Are there recognized testing protocols that evaluate products for antimicrobial properties?**

**A:** Absolutely. Aside from the routine tests specified by ANSI standards for ceramic tile assembly materials, there are ASTM and ISO test methods that evaluate antimicrobial properties of all types of products. Additionally, there are many tried and true scientific methods offered by testing laboratories that may be equally suitable and informative for evaluating antimicrobial properties of varying substrates or active

ingredients. Remember, antimicrobial evaluations are only valid if the test method is suitable for the substrate or active ingredient being tested. Some common laboratory tests for evaluating antimicrobial compounds include JIS Z2801 (Japanese Industrial Standard Antimicrobial Surface Test), Kirby-Bauer Zone of Inhibition, ASTM E2149 (Determining the Antimicrobial Activity of Immobilized Antimicrobial Agents Under Dynamic Contact Conditions), and ISO 27447 (Test Method for Antibacterial Activity of Semiconducting Photocatalytic materials).

Knowing the above facts enables all of us in the ceramic tile industry to better represent our products and installations to the public with regards to antimicrobial properties. Whether new product innovations that provide increased antimicrobial properties or simply tile assemblies that inherently provide inhospitable environments to microbes, ceramic tiles remain the premier surface for cleanliness and sanitation when it comes to the war on germs. **TILE**



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Dr. Jennifer Ariss is the Research and Standards Development Scientist at Tile Council of North America. She is

responsible for developing and modifying industry standards, assisting with TCNA’s Green Initiative, and handling research projects for TCNA members and TCNA’s Product Performance Testing Lab. Dr. Ariss has extensive experience in research, experimental design, and statistical analysis and is widely published in scientific journals.