



Standard Test Method for Determination of Antibacterial Activity on Ceramic Surfaces¹

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1. Scope

1.1 This method is designed to quantitatively evaluate the antibacterial activity of glazed ceramic surfaces that have been specifically designed to contain an antibacterial treatment as part of the glaze. This test method is meant to compare the efficacy of one ceramic surface to another ceramic surface using the stated conditions and is not meant to be extrapolated to other conditions.

1.2 Knowledge of microbiological techniques is required for this test.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E1054 Test Methods for Evaluation of Inactivators of Antimicrobial Agents

E2180 Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) In Polymeric or Hydrophobic Materials

E2756 Terminology Relating to Antimicrobial and Antiviral Agents

¹ This test method is under the jurisdiction of ASTM Committee E35 on Pesticides, Antimicrobials, and Alternative Control Agents and is the direct responsibility of Subcommittee E35.15 on Antimicrobial Agents.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

2.2 ISO Standard:³

ISO 22196 Measurement of Antibacterial Activity on Plastics and Other Non-porous Surfaces

3. Terminology

3.1 For definitions of terms used in this test method refer to Terminology E2756.

4. Summary of Test Method

4.1 This test method is used for evaluating the antibacterial effect of antimicrobials incorporated into a ceramic glaze. This standard does not seek to imitate all possible real world scenarios but to provide a standardized method to compare multiple antimicrobial technologies that can be incorporated or coated on a ceramic surface. The inherent nature of the ceramic tile allows for desiccation, therefore each ceramic specimen is equilibrated to the testing environment for 18- 24 h. Once the tiles are equilibrated, bacteria are inoculated onto the surface followed by a 24-h exposure time. Bacteria are recovered in a neutralizer broth and enumerated according to a validated method. Log reductions are calculated for a treated versus an untreated sample.

5. Significance and Use

5.1 Current solid surface test methodologies, such as the Test Method E2180 and ISO 22196, do not take into account the complexities associated with a ceramic surface. This includes, but is not limited to, differing chemistries incorporated into the glaze and desiccation due to water absorption through the bisque body. Each point will be elaborated below:

5.1.1 The glaze composition of ceramic tiles can vary between manufacturers, lots, and product lines. Some glaze chemistries such as tin, silver and copper can negatively impact the testing conditions. Therefore, an untreated tile from the same lot is not always suitable for comparison. The control tile proposed herein is capable of supporting growth over the indicated time frame and nutrient level (see Section 9).

5.1.2 Desiccation is a common problem when testing tile surfaces. This can be overcome by pre-hydrating the tile by placing the specimen on a moistened wipe and allowing

³ Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.