



Designation: E 2275 – 03

Standard Practice for Evaluating Water-Miscible Metalworking Fluid Bioresistance and Antimicrobial Pesticide Performance¹

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1. Scope

1.1 This practice addresses the evaluation of the relative inherent bioresistance of water-miscible metalworking fluids, the bioresistance attributable to augmentation with antimicrobial pesticides or both. It replaces Methods D 3946 and E 686.

1.2 In this practice relative bioresistance is determined by challenging metalworking fluids with a biological inoculum that may either be characterized (comprised of one or more known biological cultures) or uncharacterized (comprised of biologically contaminated metalworking fluid or one or more unidentified isolates from deteriorated metalworking fluid). Challenged fluid bioresistance is defined in terms of resistance to biomass increase, viable cell recovery increase, chemical property change, physical property change or some combination thereof.

1.3 This practice is applicable to antimicrobial agents that are incorporated into either the metalworking fluid concentrate or end-use dilution. It is also applicable to metalworking fluids that are formulated using non-microbicidal, inherently bioresistant components.

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:

- D 888 Test Methods for Dissolved Oxygen in Water²
- D 1067 Test Methods for Acidity or Alkalinity of Water²
- D 1193 Specification for Reagent Grade Water²
- D 3342 Method for Dispersion Stability of New (Unused) Rolling Oil Dispersions in Water³
- D 3519 Test Method for Foam in Aqueous Media (Blender Test)³
- D 3601 Test Method for Foam in Aqueous Media (Bottle Test)³

D 4012 Test Method for Adenosine Triphosphate (ATP) Content of Microorganisms in Water⁴

D 4627 Method for Iron Chip Corrosion for Water-Dilutable Metalworking Fluids³

D 5465 Practice for Determining Microbial Colony Counts from Waters Analyzed by Plating Methods⁴

E 70 Test Method for pH of Aqueous Solutions with the Glass Electrode⁵

E 1326 Guide for Evaluating Nonconventional Microbiological tests Used for Enumerating Bacteria⁶

E 2169 Practice for Selecting Antimicrobial Pesticides for use in Water-miscible Metalworking Fluids⁷

2.2 Other Standards:

4.027 Synthetic Hard Water⁸

9215A.6a Heterotrophic Plate Count Media, Plate Count Agar⁹

9216 Direct Total Microbial Count⁹
Microbiological Test <71>¹⁰

2.3 Government Standard:

40 CFR 156 Labeling Requirements for Pesticides and Devices

3. Terminology

3.1 Definitions:

3.1.1 *active ingredient, n*—the chemical component or components of an antimicrobial pesticide that provides its microbicidal performance.

3.1.2 *antimicrobial pesticide, n*—chemical additive registered under 40 CFR 152, for use to inhibit growth, proliferation or both of microorganisms.

3.1.3 *as supplied, adj*—antimicrobial pesticide finished product including the active ingredient(s), solvent and any additional inactive ingredients.

⁴ Annual Book of ASTM Standards, Vol 11.02.

⁵ Annual Book of ASTM Standards, Vol 15.05.

⁶ Annual Book of ASTM Standards, Vol 11.05.

⁷ Annual Book of ASTM Standards, Vol 11.03.

⁸ AOAC International Methods of Analysis, AOAC International, Gaithersburg, MD.

⁹ Available from American Public Health Association (APHA) *Standard Methods for the Examination of Water and Wastewater* 800 I Street, NW Washington, DC 20001.

¹⁰ Available from U.S. Pharmacopeia/National Formulary (USP/NF), 12601 Twinbrook Parkway Rockville, MD 20852.

¹ This practice is under the jurisdiction of ASTM Committee E35 on Geosynthetics and is the direct responsibility of Subcommittee E35.15 on Antimicrobial Agents.

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² Annual Book of ASTM Standards, Vol 11.01.

³ Annual Book of ASTM Standards, Vol 05.02.