



# Standard Terminology for Metalworking Fluids and Operations<sup>1</sup>

This standard is issued under the fixed designation E2523; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope\*

1.1 This terminology standard provides a compilation of ASTM and non-ASTM consensus definitions of terms used in the metalworking industry.

1.2 This terminology standard does not purport to be an exhaustive lexicon. Rather, it defines terms relevant to metalworking fluid management and metalworking fluid health and safety.

1.3 This terminology standard defines primary metalworking operations, fluid types, and other terms germane to the practice of metalworking fluid management.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

**D1356** Terminology Relating to Sampling and Analysis of Atmospheres

**D2881** Classification for Metalworking Fluids and Related Materials

**D6161** Terminology Used for Microfiltration, Ultrafiltration, Nanofiltration, and Reverse Osmosis Membrane Processes

**D7049** Test Method for Metalworking Fluid Aerosol in Workplace Atmospheres

**E1302** Guide for Acute Animal Toxicity Testing of Water-Miscible Metalworking Fluids

**E1497** Practice for Selection and Safe Use of Water-Miscible and Straight Oil Metal Removal Fluids

**E1687** Test Method for Determining Carcinogenic Potential of Virgin Base Oils in Metalworking Fluids

**E1972** Practice for Minimizing Effects of Aerosols in the Wet Metal Removal Environment (Withdrawn 2017)<sup>3</sup>

**E2144** Practice for Personal Sampling and Analysis of Endotoxin in Metalworking Fluid Aerosols in Workplace Atmospheres

**E2148** Guide for Using Documents Related to Metalworking or Metal Removal Fluid Health and Safety

**E2169** Practice for Selecting Antimicrobial Pesticides for Use in Water-Miscible Metalworking Fluids

**E2275** Practice for Evaluating Water-Miscible Metalworking Fluid Bioresistance and Antimicrobial Pesticide Performance

**E2563** Practice for Enumeration of Non-Tuberculosis *Mycobacteria* in Aqueous Metalworking Fluids by Plate Count Method

**E2564** Practice for Enumeration of *Mycobacteria* in Metalworking Fluids by Direct Microscopic Counting (DMC) Method

**E2657** Practice for Determination of Endotoxin Concentrations in Water-Miscible Metalworking Fluids

**E2693** Practice for Prevention of Dermatitis in the Wet Metal Removal Fluid Environment

**E2694** Test Method for Measurement of Adenosine Triphosphate in Water-Miscible Metalworking Fluids

### 2.2 Government Standards:<sup>4</sup>

**29 CFR 1910.1200** Occupational Safety and Health Standards, Hazard Communication

**40 CFR 156** Labeling Requirements for Pesticides and Devices

<sup>1</sup> This terminology is under the jurisdiction of ASTM Committee E34 on Occupational Health and Safety and is the direct responsibility of Subcommittee E34.50 on Health and Safety Standards for Metal Working Fluids.

Current edition approved Nov. 1, 2023. Published November 2023. Originally approved in 2006. Last previous edition approved in 2018 as E2523 – 13 (2018). DOI: 10.1520/E2523-23.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).

<sup>4</sup> Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

## 3. Significance and Use

3.1 Personnel from a wide range of disciplines contribute to metalworking fluid management and plant environment health

\*A Summary of Changes section appears at the end of this standard

and safety management. Consequently, terms familiar to some stakeholders will be unfamiliar to others.

3.2 This terminology standard provides, in a single document, a compilation of definitions used by personnel involved with both metalworking environment health and safety and fluid management.

3.3 Use of terms as defined in this terminology standard will enable all stakeholders to use metalworking industry terms in the appropriate context, thereby improving interdisciplinary communications.

## 4. Terminology

**acid-fast bacteria**, *n*—a distinctive staining property of *Mycobacteria* due to their lipid-rich cell walls.

DISCUSSION—Once stained, mycobacterium resist decolorization when exposed to acidified organic solvents and are, therefore, informally designated acid-fast. **E2564**

**active ingredient (a.i.)**, *n*—the chemical or components of an antimicrobial pesticide that provides its antimicrobial performance. **E2169, E2275**

**acute dermal toxicity**, *n*—health hazards likely to arise from short-term exposure to a substance via the skin or mucosa. **E1302**

DISCUSSION—Results of acute dermal toxicity testing may provide initial information on the dermal absorption and the mode of toxic action of a substance. Moreover, some measure of irritation caused by the fluid may be obtained by observing local tissue damage at the site of application. Endpoint: mortality.

**acute inhalation toxicity**, *n*—the potential of a fluid, vapor, or gas to cause death and other adverse health effects when inhaled for a specified time period. **E1302**

DISCUSSION—The endpoint may be mortality or other specific health effect designated in the test protocol.

**acute oral toxicity**, *n*—health hazards likely to arise from short-term exposure to a substance via the oral route (ingestion). **E1302**

DISCUSSION—Results of acute oral toxicity tests are used to develop warning statements on labels as may be required by OSHA Hazard Communication Standard 29 CFR 1910.1200 or Federal Hazardous Substances Act. These are also used to establish a dosage regimen for subchronic and other testing. Endpoint: mortality.

**adenosine monophosphate (AMP)**, *n*—the molecule formed by the removal of two molecules of phosphate (one pyrophosphate molecule) from ATP. **E2694**

**adenosine triphosphate (ATP)**, *n*—a molecule comprised of a purine and three phosphate groups that serves as the primary energy transport molecule in all biological cells. **E2694**

**aerosol**, *n*—a dispersion of solid or liquid particles in a gaseous medium. **D1356**

**antimicrobial pesticide**, *n*—chemical additive registered under 40 CFR 156, for use to inhibit growth, proliferation, or both of microorganisms. **E2169, E2275**

DISCUSSION—Antimicrobial pesticides are registered for one or more end-use applications, or sites, for use within an approved dose range.

**aseptic**, *adj*—sterile, free from viable microbial contamination. **E2694**

**as supplied (a.s.)**, *adj*—antimicrobial pesticide finished product including the active ingredients, solvent, and any additional inactive ingredients. **E2275**

**background RLU**, *n*—the quantity of relative light units resulting from running the Method without incorporation of the sample. **E2694**

**bactericide**, *n*—an antimicrobial pesticide specifically or primarily effective against bacteria. **E2169**

**bioburden**, *n*—the level of microbial contamination (biomass) in a system. **E2169**

DISCUSSION—Typically, bioburden is defined in terms of either biomass or numbers of cells per unit volume or mass or surface area material tested (g biomass/mL; g biomass/g sample; cells/mL sample; colony forming units (CFU)/mL sample and so forth).

**biocide**, *n*—any chemical intended for use to kill organisms. **E2169, E2275**

DISCUSSION—Biocide is a term usually used synonymously with the preferred *antimicrobial pesticide* or *microbicide*.

**biodeterioration**, *n*—the loss of commercial value, performance characteristics, or both of a product (metalworking fluid) or material (coolant system or finished parts) through biological processes. **E2169**

**biofilm**, *n*—a film or layer composed of microorganisms, biopolymers, water, entrained organic and inorganic debris that forms as a result of microbial growth, proliferation, and excretion of polymeric substances at phase interfaces (liquid-liquid, liquid-solid, liquid-gas, and so forth). (synonym: *skinnogen layer*). **E2169**

**bioluminescence**, *n*—the production and emission of light by a living organism as the result of a chemical reaction during which chemical energy is converted to light energy. **E2694**

**biomass**, *n*—any matter which is or was a living organism or excreted from a microorganism. **D6161**

**bioresistant**, *adj*—ability to withstand biological attack. **E2169, E2275**

DISCUSSION—Bioresistant, or recalcitrant, chemicals are not readily metabolized by microorganisms.

**biostatic**, *adj*—able to prevent existing microbial contaminants from growing or proliferating, but unable to kill them. **E2169, E2275**

DISCUSSION—Biostatic additives may be registered antimicrobial pesticides or unregistered chemicals with other performance properties. The difference between biocidal and biostatic performance may be attributed to dose, chemistry, or both.

**boring**, *v*—enlarging a hole that already has been drilled.

DISCUSSION—Generally, boring is an operation of truing the previously drilled hole with a single-point, lathe-type tool. Boring is essentially internal turning.

**breathing zone**, *n*—that location in the atmosphere at which persons breathe. **D1356**