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An American National Standard

Standard Terminology for Metalworking Fluids and Operations[1]

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

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 1356 Terminology Relating to Sampling and Analysis of Atmospheres

D 2881 Classification for Metal Working Fluids and Related Materials

D 7049 Test Method for Metal Removal Fluid Aerosol in Workplace Atmospheres

E 1302 Guide for Acute Animal Toxicity Testing of Water-Miscible Metalworking Fluids

E 1497 Practice for Selection and Safe Use of Water-Miscible and Straight Oil Metal Removal Fluids

E 1687 Test Method for Determining Carcinogenic Potential of Virgin Base Oils in Metalworking Fluids

E 1972 Practice for Minimizing Effects of Aerosols in the Wet Metal Removal Environment

E 2144 Practice for Personal Sampling and Analysis of Endotoxin in Metalworking Fluid Aerosols in Workplace Atmospheres

E 2148 Guide for Using Documents Related to Metalworking or Metal Removal Fluid Health and Safety

E 2169 Practice for Selecting Antimicrobial Pesticides for Use in Water-Miscible Metalworking Fluids

E 2250 Method for Determination of Endotoxin Concentration in Water Miscible Metal Working Fluids

E 2275 Practice for Evaluating Water-Miscible Metalworking Fluid Bioresistance and Antimicrobial Pesticide Performance

2.2 *Government Standards:*[3]

29 CFR 1910.1200 Occupational Safety and Health Standards, Hazard Communication

40 CFR 156 Labeling Requirements for Pesticides and Devices

3. Significance and Use

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

active ingredient (a.i.), *n*—the chemical or components of an antimicrobial pesticide that provides its antimicrobial performance. **E 2169, E 2275**

acute dermal toxicity, *n*—health hazards likely to arise from short-term exposure to a substance via the skin or mucosa. **E 1302**

[1] 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.

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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.

[3] 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.

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. Endpoint: mortality. **E 1302**

acute oral toxicity, *n*—health hazards likely to arise from short-term exposure to a substance via the oral route (ingestion). **E 1302**

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.

aerosol, *n*—a dispersion of solid or liquid particles in a gaseous medium. **D 1356**

antimicrobial pesticide, *n*—chemical additive registered under 40 CFR 156, for use to inhibit growth, proliferation or both of microorganisms. **E 2169, E 2275**

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

as supplied (a.s.), *adj*—antimicrobial pesticide finished product including the active ingredients, solvent and any additional inactive ingredients. **E 2275**

bactericide, *n*—an antimicrobial pesticide specifically or primarily effective against bacteria. **E 2169**

bioburden, *n*—the level of microbial contamination (biomass) in a system. **E 2169**

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. **E 2169, E 2275**

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. **E 2169**

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*). **E 2169**

bioresistant, *adj*—ability to withstand biological attack. **E 2169, E 2275**

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. **E 2169,E 2275**

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 breath. **D 1356**

Discussion—The worker's breathing zone consists of a hemisphere 300-mm radius in front of the face and measured from a line bisecting the ears (D 7049).

broaching, *v*—an operation in which a cutter progressively enlarges a slot or hole or shapes a workpiece exterior.

Discussion—Low teeth start the cut, intermediate teeth remove the majority of the material and high teeth finish the task. Broaching can be a one-step operation, as opposed to milling and slotting, which require repeated passes. Typically, however, broaching also involves multiple passes.

bubbler, *n*—a sampling device consisting of a gas dispenser immersed in an absorbing liquid. **D 1356**

coining, *v*—a closed-die squeezing operation in which all surfaces of the work are restrained (coined).

Discussion—Coining often imparts a pattern or shape onto the workpiece. Coining also refers to a press-brake bending operation in which the punch bottoms against the workpiece and the die. It also refers to a process similar to bottoming although greater force is applied. Coining alters the radius, and bottoming sets the bend open but does not affect shape.

collector, *n*—a device for removing and retaining contaminants from air or other gases. **D 1356**

contaminant, *n*—substances contained in in-use metalworking fluids that are not part of the received fluid, such as abrasive particles, tramp oils, cleaners, dirt, metal fines and shavings, dissolved metal and hard water salts, bacteria, fungi and microbiological decay products, and waste. **E 1497**

contamination control, *n*—maintenance of bioburden at an operationally defined level, at or below which the bioburden does not affect the fluid or system adversely. **E 2169**

control, *v*—to prevent, eliminate or reduce hazards related to the use of metalworking fluids in metalworking processes and to provide appropriate supplemental, or interim protection, or both, as necessary, to employees. **E 1497**

coolant, *n*—any liquid used for the purpose of facilitating heat removal from metal removal, forming or both types of metalworking operations.

Discussion—Coolants are typically classified by the general chemical composition as emulsifiable oils, semi-synthetic oils, straight oils or synthetic fluid (Classification D 2881). See definitions 4.32, 4.72, 4.77