



Standard Test Method for Metalworking Fluid Aerosol in Workplace Atmospheres¹

This standard is issued under the fixed designation D7049; 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 (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers a procedure for the determination of both total collected particulate matter and extractable mass metalworking fluid aerosol concentrations in the range of 0.07 to 5 mg/m³ in workplace atmospheres.

1.2 This test method describes a standardized means of collecting worker exposure information that can be compared to existing exposure databases, using a test method that is also more specific to metal removal fluids.

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, 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:²

D1356 Terminology Relating to Sampling and Analysis of Atmospheres

D3195/D3195M Practice for Rotameter Calibration

D4532 Test Method for Respirable Dust in Workplace Atmospheres Using Cyclone Samplers

D4840 Guide for Sample Chain-of-Custody Procedures

D5337 Practice for Setting and Verifying the Flow Rate of

Personal Sampling Pumps

E1542 Terminology Relating to Occupational Health and Safety

2.2 *U.S. Government Regulations:*³

29 CFR 1910.1000 Air Contaminants

29 CFR 1910.1450 Occupational Exposure to Hazardous Chemicals in Laboratories

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms relating to this test method, refer to Terminologies **D1356** and **E1542**.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *extractable mass, n*—the amount of material removed by liquid extraction of the filter using a mixed-polarity solvent mixture.

3.2.1.1 *Discussion*—This mass is an approximation of the metal removal fluid portion of the workplace aerosol.

3.2.2 *filter set, n*—a group of filters from the same production lot that are weighed and assembled into the filter cassettes at one time.

3.2.2.1 *Discussion*—The filter set may be used for sampling on multiple days with the appropriate field blanks being submitted for each sampling day.

3.2.3 *metal removal fluids, n*—the subset of metalworking fluids that are used for wet machining or grinding to produce the finished part; such fluids are often characterized as straight, soluble, semisynthetic, and synthetic.

3.2.3.1 *Discussion*—Metalworking fluids addressed by this test method include straight or neat oils not intended for further dilution with water, and water-miscible soluble oils, semi-synthetics, and synthetics, which are intended to be diluted with water before use. Metalworking fluids become contaminated during use in the workplace with a variety of workplace substances including, but not limited to: abrasive particles, tramp oils, cleaners, dirt, metal fines and shavings, dissolved metal and hard water salts, bacteria, fungi, microbiological decay products, and waste. These contaminants can cause changes in the lubricity and cooling ability of the metal

¹ This test method 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 Occupational Safety and Health Administration (OSHA), 200 Constitution Ave., NW, Washington, DC 20210, <http://www.osha.gov>.