



Designation: E 1373 – 92 (Reapproved 1996)

Standard Test Method for Conducting a Subchronic Inhalation Toxicity Study in Rats¹

This standard is issued under the fixed designation E 1373; 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 determines the no-observed-effect level and toxic effects associated with continuous or repeated inhalation exposure to a chemical, pesticide, or mixture for a period of 90 days. The test is not capable of determining those effects that have a long latency period for development (for example, carcinogenicity and life shortening).

1.2 This test method which is applicable to a gas, vapor, aerosol, or particulate is conducted after initial information on toxicity is obtained by acute testing.

1.3 *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:

E 609 Definition of Terms Relating to Pesticides²

E 943 Terminology Relating to Biological Effects and Environmental Fate²

2.2 Federal Standards:

Title 40, Code of Federal Regulations (CFR), Environmental Protection Agency, Part 798, Health Effects Testing Guidelines, Subpart C, Subchronic Inhalation Toxicity: 90-Day Study³

Title 40, Code of Federal Regulations (CFR), Environmental Protection Agency, Subchapter E, Pesticide Programs; Part 160, Good Laboratory Practice Standards³

Title 21, Code of Federal Regulations (CFR), Food and Drug Administration, Part 58, Laboratory Practice for Nonclinical Laboratory Studies³

Title 40, Code of Federal Regulations (CFR), Toxic Substance Control Act, Part 792, Good Laboratory Practice Standards³

3. Terminology

3.1 **Definitions**—Refer to Definitions E 609 and Terminology E 943.

3.1.1 **aerodynamic diameter**—The diameter of the unit density sphere that has the same settling velocity due to gravity as the particle under consideration. It is used to compare particles of different size and densities and to predict where in the respiratory tract such particles may be deposited.^{4,5}

3.1.2 **geometric mean diameter or median diameter**—The calculated aerodynamic diameter that divides the particles of an aerosol in half, based on the weight of the particles. Fifty percent of the particles by weight will be larger than the median diameter and 50 % of the particles will be smaller than the median diameter. The median diameter describes the particle size distribution of any aerosol based on the weight and size of the particles.

3.1.3 **geometric standard deviation**—The measure of dispersion for a log-normal distribution, the ratio of the 84.13 percentile to the 50 percentile and 50 percentile to the 15.8 percentile.

3.1.4 **inhalable diameter**—The aerodynamic diameter of a particle that is considered to be inhalable for the organism. It is used to refer to particles that are capable of being inhaled and deposited anywhere within the respiratory tract from the trachea to the alveoli. For man, inhalable diameter is considered as 15 μm or less (see CFR Title 40, Part 798).

3.1.5 **cumulative toxicity**—The adverse effects caused when the inactivation or excretion, or both, of a substance is slower than the rate at which the substance is being administered. Since there is more of the substance entering the body than is being removed, a build up results, causing repeated dosage of the substance to produce a more marked response than after the first dose.

4. Summary of Test Method (see CFR Title 40, Part 798 and Literature⁶)

4.1 Three groups of 20 rats (10 female, 10 males) each are used for at least three dose levels. Doses should be spaced appropriately to produce test groups with a range of toxic effects and mortality rates.

4.2 A concurrent control group of 20 rats should be untreated or sham treated.

¹ This test method is under the jurisdiction of ASTM Committee E-35 on Pesticides and is the direct responsibility of Subcommittee E35.26 on Safety to Man. Current edition approved June 15, 1992. Published August 1992. Originally published as E 1373 – 90. Last previous edition E 1373 – 90.

² *Annual Book of ASTM Standards*, Vol 11.05.

³ Available from U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20402.

⁴ Hinds, William C., *Aerosol Technology, Properties, Behavior, and Measurement of Airborne Particles*, John Wiley & Sons, 1982.

⁵ Richard, D., *Handbook on Aerosols*, U.S. Energy Research and Development Administration, 1976.

⁶ Leong, Basil K. J., *Inhalation Toxicology and Technology*, Ann Arbor Science, 1981.