



Standard Test Method for Conducting a Saturated Vapor Inhalation Study with Rats¹

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1. Scope

1.1 This test method estimates the relative hazard of handling a liquid chemical, pesticide, or mixture, where exposure to vapors from spilled liquids may result.

1.2 The results of this test method may also be used to evaluate and compare the relative hazard between two liquid chemicals.

1.3 This test method measures hazard rather than quantitative toxicity because the amount inhaled is governed by vapor pressure. It is recognized that the vapor air mixture in this test is not completely saturated, although for brevity it is known as saturated vapor.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.5 *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. See Section 7 for additional hazard information.*

2. Referenced Documents

2.1 ASTM Standards:

E 609 Definitions of Terms Relating to Pesticides²

E 943 Terminology Relating to Biological Effects and Environmental Fate²

2.2 Federal Standards:³

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

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

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

3. Terminology

3.1 *vapors*—the gaseous forms of compounds or mixtures which are normally in the liquid or solid state.

3.2 *vapor pressure*—the pressure characteristic at any given temperature of a vapor in equilibrium with its liquid or solid form.

4. Summary of Test Method

4.1 Two groups of six male rats each are placed in 9-L glass desiccators that serve as inhalation chambers.

4.2 Compressed air at 1 L/min is bubbled through the test material in a gas-washing bottle and then passed through the inhalation chamber. The exposure time is 8 h. One bottle holds the test liquid at room temperature and the other bottle is held at 100° C in a hot oil bath.

4.3 A third group of six rats is placed in another desiccator and has only compressed air passing through it. This is the control group.

4.4 Upon completion of the exposure, the gas-washing bottles are weighed again and the nominal concentration is expressed as a ratio of the test material expelled to the total volume of air delivered in each test chamber.

4.5 On Day 14 postexposure, the surviving rats are sacrificed, examined for gross abnormalities, and a complete necropsy done.

5. Significance and Use

5.1 This test method determines the potential inhalation hazard of a liquid material where exposure consists of inhaling vapors.⁴

5.2 The results of this test method may be used to compare and evaluate the relative vapor hazard between two liquid materials.

5.3 This test method is also applicable to materials whose melting point is slightly above room temperature.

5.4 Results of this test method can provide information for conducting acute and subchronic inhalation studies.

6. Apparatus

6.1 Inhalation Chambers:

6.1.1 Use three large glass desiccators (9-L), each to hold one group of animals. Place a 2-hole rubber stopper in the top

¹ This specification is under the jurisdiction of Committee E-35 on Pesticides and is the direct responsibility of Subcommittee E35.26 on Safety to Man.

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

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

⁴ Carpenter, C. P., Smyth Jr., H. F., and Pozzani, U. C., "The Assay of Acute Toxicity, and the Grading and Interpretation of Results on 96 Chemical Compounds," *Journal of Industrial Hygiene and Toxicology*, Vol 31, 1949, pp. 343–346.