



Standard Test Method for Estimating Sensory Irritancy of Airborne Chemicals¹

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1. Scope

1.1 This laboratory test method provides a rapid means of determining sensory irritant potential of airborne chemicals or mixtures. It may also be used to estimate threshold limit values (TLV) for man. However, it cannot be used to evaluate the relative obnoxiousness of odors.

1.2 This test method is intended as a supplement to, not a replacement for, chronic inhalation studies used to establish allowable human tolerance levels.

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.* Specific hazard information is given in Section 6.

2. Summary of Test Method

2.1 This test method quantitatively measures irritancy as indicated by the reflex inhibition of respiration in mice exposed to sensory irritants.

2.2 Four mice are simultaneously exposed to the airborne chemical. Usually a sufficient number of groups of animals are exposed to a geometric series of concentrations so that a concentration-response curve can be constructed. For simple preliminary comparisons, however, a single group of four animals at one concentration will suffice.

2.3 The mice are placed in a body plethysmograph attached to an exposure chamber so that only the head is exposed to the test material. The plethysmographs are connected to pressure transducers, which sense changes created by inspiration and expiration. The amplified signals are transmitted to a polygraph recorder.

2.4 The concentration of airborne irritant that produces a 50 % decrease in respiratory rate (RD50) is determined from the concentration-response curve constructed from the various data points obtained with a series of concentrations.

3. Significance and Use

3.1 This test method was developed to meet the following criteria:

3.1.1 It provides positive recognition of sensory irritants of widely varying potencies.

3.1.2 It is sufficiently simple to permit the testing of large numbers of materials.

3.1.3 This test method is capable of generating concentration-response curves for purposes of compound comparison.

3.1.4 This test method has good reproducibility.

3.2 This test method can be used for a variety of divergent purposes, including the assessment of comparative irritancy of compounds or formulations and setting interim exposure levels for the workplace **(1, 2)**.²

3.3 It has been shown that for a wide variety of chemicals and mixtures, a perfect rank order correlation exists between the decreases in respiratory rate in mice and subjective reports of sensory irritation in man **(1, 3, 4, 5)**.

3.4 A quantitative estimate of the sensory irritancy of a wide variety of materials can be obtained from concentration-response curves developed using this method **(1, 3, 4, 6, 7, 8, 9)**.

3.5 Although this test method is intended to measure sensory irritation of the nasal mucosa, the cornea is innervated by the same nerve. This animal model will, therefore, allow an estimate of the irritant potential of cosmetic ingredients or other household products to the eye, assuming that they can be aerosolized **(10)**.

3.6 This test method is recommended for setting interim guidelines for exposure of humans to chemicals in the workplace, to assess acute sensory irritation resulting from inadvertent spills of household products, and to assess the comparative irritancy of formulations or materials intended for a variety of uses (see Appendix X2).

3.7 This test method will detect irritating effects at concentrations far below those at which pathological changes are observed **(9)**.

NOTE 1—A good overview of the toxicological evaluation of irritant compounds is given in Ref **(8)**.

¹ This test method is under the jurisdiction of ASTM Committee E35 on Pesticides and is the direct responsibility of Subcommittee E35.26 on Safety to Man.

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² The boldface numbers in parentheses refer to the list of references at the end of this standard.

