



Designation: E 939 – 94

Standard Test Method of Field Testing Topical Applications of Compounds as Repellents for Medically Important and Pest Arthropods (Including Insects, Ticks, and Mites): Mosquitoes¹

This standard is issued under the fixed designation E 939; 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 is used to evaluate the repellency of promising compounds that have undergone primary laboratory studies and have been approved for skin application for secondary testing.

1.2 This test method is designed for the study of mosquito repellents, but with some modifications this test method can be used to determine the repellency of candidate compounds for other flying insects that attack humans.

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. Terminology

2.1 *Description of Term Specific to This Standard:*

2.1.1 *complete protection time (CPT)*—the time from application of the repellent to the time of the first confirmed bite (a second bite by the same species within 30 min of the first). This permits any number of unconfirmed bites during the CPT.

3. Summary of Test Method

3.1 A measured amount of the candidate material is applied to the forearm or sometimes the lower leg. These areas are then protected from rubbing and are continuously exposed to mosquitoes in the field to determine the length of time the treatment provides either complete protection or a high level of protection.

4. Significance and Use

4.1 This test method is an important part of the final phase of study in the development of mosquito repellents for personal use.

4.2 This test method is primarily designed to simulate a situation in which a person treated with a repellent is exposed to natural populations of attacking mosquitoes.

4.3 The simplicity of the test offers flexibility under a relatively wide range of circumstances and geographical locations. By following this test method, international testing with a variety of vector mosquito populations is no more difficult to accomplish than tests with various domestic species.

4.4 A number of people test topical applications of a repellent for the following reasons:

4.4.1 To determine how long the repellent is effective;

4.4.2 To establish the effective dosage range;

4.4.3 To establish the range of effectiveness on several mosquito genera and species in a number of geographical areas; and

4.4.4 To identify the material in terms of odor, staining capability, plasticizing effect, and oiliness or greasiness.

4.5 No repellent should be tested on humans without the written consent of the test volunteers (hereafter referred to as test subjects) and prior approval of competent authority, as designated in applicable laws and regulations governing experimentation on humans.

5. Apparatus

5.1 *Insect collection vials.*

5.2 *Aspirator.*

5.3 *Stereoscope (optional).*

5.4 *Standard References for Mosquito Identification*, for determining species present in the field (optional).

5.5 *Temperature and Humidity Reading Equipment*—Ideally, a continuous recording device such as a hygrothermograph should be used to record conditions during tests. If such equipment is not available, readings should be made immediately before, midway during, and immediately after the tests are made, using a sling psychrometer.

5.6 *Air Speed Indicator and Light Meter*, optional but preferred if equipment is available.

5.7 *Watch.*

5.8 *Headnets.*

5.9 *Cotton Gloves.*

5.10 *Battery-Operated Head Lamps*, with red filters for tests with nocturnally active species.

5.11 *Notebook, Test Sheets, and Pencils*, for recording species, test data, date, and locality of the test. A sample work sheet is attached with recorded results (see Annex A1.).

¹ This test method is under the jurisdiction of ASTM Committee E-35 on Pesticides and is the direct responsibility of Subcommittee E35.12 on Insect Control Agents.

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