Designation: E 460 – 88 (Reapproved 1995)

# Standard Practice for Determining Effect of Packaging on Food and Beverage Products During Storage[1]

This standard is issued under the fixed designation E 460; 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 practice is designed to detect the changes in sensory attributes of foods and beverages stored in various packaging materials or systems, or both. It is not a practice intended to determine shelf-life.

1.2 This practice may be used for testing a wide variety of materials in association with many kinds of products. There are many ways in which a packaging material may influence a product during storage. First, the packaging material may contaminate the product with off-flavors by direct transfer of packaging component compounds to the product. Second, the packaging material may adsorb components from the product which may then be further transferred to the atmosphere, thus reducing aroma intensity in the product. Third, external contaminants may permeate the package and possibly be transferred to the product. In addition to flavor influences, packaging materials may allow color or textural changes, or both, and many other measurable sensory effects.

## 2. Summary of Practice

2.1 A homogeneous lot of the product is packaged in the different ways to be considered in the test. Packaging operations must be controlled to ensure that all units are treated alike except for the differences inherent in the different packaging materials. To reduce error from test product variability a single production lot should be used. Where a single lot is not feasible a sufficient number of replicates should be used, taking care not to introduce additional variables.

2.2 Design the study to specify all appropriate storage conditions, intervals between tests, and total length of study. A sufficient number of units of each packaging treatment are stored under predetermined storage conditions to provide the necessary material for panel testing.

2.3 Periodically, samples of all treatments are withdrawn and evaluated versus a designated control by a qualified panel. Results are subjected to appropriate statistical analyses to determine whether there are significant differences among treatments.

2.4 Withdrawals are continued either through the originally planned length of storage, or until definitive results are obtained. Differences which are identified may not necessarily be detrimental to the product.

## 3. Significance and Use

3.1 This practice is designed to determine the effects of different packaging materials whether of construction or systems (overpack, inert atmosphere, etc.), or both. Different packaging materials may require different packaging systems and thus detectable differences may not be experimentally separable from these influences. The practice then, is limited to those situations where comparative results are meaningful. This practice should be used where experimental materials or alternate storage conditions are evaluated against a known control, for example, a soft drink in cans with experimental liners versus known liners, or potato sticks in plastic bags versus coated paper bags. Accepted industry standard packages, such as glass bottles and metal cans may also be used as controls.

## 4. Design of Study

4.1 *Number of Treatments*—The number of alternate packages or systems that may be assessed is dependent upon panel capabilities. Preliminary testing should be used to determine the appropriate number of samples that can be presented during a single panel session without inducing panelist fatigue or adaptation and the number of panels that can be run within the project time frame.

4.2 *Test Product and Packaging Material*:

4.2.1 The selection of the test products is usually indicated by the interest in testing a specific packaging system.

4.2.2 The original lot of product should be homogeneous and representative of the product. When homogeneity is not possible, allocate sufficient units of the product to each packaging treatment using an appropriate statistical design.

4.2.3 Ensure that both initially and at every test interval the test products meet all required microbiological, physical, and chemical standards prior to panelist ingestion.

4.2.4 Packaging operations must be controlled to ensure that all units are treated alike except for the differences inherent in the different packaging materials.

4.3 *Storage Conditions*:

4.3.1 Determine pertinent storage conditions for each packaging system under study. Determine on the basis of prior

[1] This practice is under the jurisdiction of ASTM Committee E-18 on Sensory Evaluation of Materials and Products and is the direct responsibility of Subcommittee E18.05 on Sensory Applications—General.

Current edition approved April 29, 1988. Published June 1988. Originally published as E 460 – 72. Last previous edition E 460 – 72 (1978).