



Standard Test Method for Sensory Analysis — Triangle Test¹

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1. Scope

1.1 This test method covers a procedure for determining whether a perceptible sensory difference exists between samples of two products.

1.2 This test method applies whether a difference may exist in a single sensory attribute or in several.

1.3 This test method is applicable when the nature of the difference between the samples is unknown. It does not determine the size or the direction of the difference. The attribute(s) responsible for the difference are not identified.

1.4 Compared to the duo-trio test, the triangle test can achieve an equivalent level of statistical significance with fewer assessors. For details on how the triangle test compares to other three-sample tests, see Refs (1), (2), (3) and (4).²

1.5 This test method is applicable only if the products are homogeneous. If two samples of the same product can often be distinguished, then another method, for example, descriptive analysis, may be more appropriate.

1.6 This test method is applicable only when the products do not cause excessive sensory fatigue, carryover or adaptation.

1.7 *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 253 Terminology Relating to Sensory Evaluation of Materials and Products³

E 456 Terminology for Relating to Quality and Statistics⁴

E 1871 Practice for Serving Protocol for Sensory Evaluation of Foods and Beverages³

2.2 ISO Standard:

ISO 4120 Sensory Analysis – Methodology – Triangular Test⁵

3. Terminology

3.1 *Definitions*—For definition of terms relating to sensory analysis, see Terminology E 253, and for terms relating to statistics, see Terminology E 456.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 α (*alpha*) *risk*—the probability of concluding that a perceptible difference exists when, in reality, one does not. (Also known as Type I Error or significance level.)

3.2.2 β (*beta*) *risk*—the probability of concluding that no perceptible difference exists when, in reality, one does. (Also known as Type II Error.)

3.2.3 p_c —the probability of a correct response.

3.2.4 p_d (*proportion of discriminators*)—the proportion of the population represented by the assessors that can distinguish between the two products.

3.2.5 *product*—the material to be evaluated.

3.2.6 *sample*—the unit of product prepared, presented, and evaluated in the test.

3.2.7 *sensitivity*—a general term used to summarize the performance characteristics of the test. The sensitivity of the test is rigorously defined, in statistical terms, by the values selected for α , β , and p_d .

3.3 *triad*—the three uniquely coded samples given to an assessor in the triangle test; two samples are alike (that is, of one product) and one is different (that is, of the other product).

4. Summary of Test Method

4.1 Clearly define the test objective in writing.

4.2 Choose the number of assessors based on the level of sensitivity desired for the test. The sensitivity of the test is, in part, a function of two competing risks: the risk of declaring the samples different when they are not (that is, α -risk) and the risk of not declaring the samples different when they are (that is, β -risk). Acceptable values of α and β vary depending on the test objective and should be determined before the test (see Appendix X3).

4.3 Assessors receive a triad and are informed that two of the samples are alike and that one is different. The assessors

¹ This test method is under the jurisdiction of ASTM Committee E18 on Sensory Evaluation of Materials and Products and is the direct responsibility of Subcommittee E18.04 on Fundamentals of Sensory.

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² The boldface numbers given in parentheses refer to a list of references at the end of the text.

³ *Annual Book of ASTM Standards*, Vol 15.08.

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

⁵ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.