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Standard Guide for Sensory Evaluation of Beverages Containing Alcohol¹

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1. Scope

1.1 This guide provides guidelines specific to the sensory and consumer evaluation of alcoholic beverages, including but not limited to beer, wine, coolers, cocktails, ready to drinks, liqueurs, hard ciders, hard seltzers, and distilled spirits.

1.2 This guide covers assessor selection, sample preparation, serving protocols, and evaluation recommendations for specific alcoholic products.

1.3 This guide addresses safety, regulatory, and legal concerns, but does not cover all legal rules for alcohol and sensory evaluation around the world. It is the responsibility of the user to be aware of their current local laws and regulations, corporate policies and procedures, and confirm they haven't changed since publication.

1.4 This guide does not cover the evaluation of raw materials or specific test methods.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[E253 Terminology Relating to Sensory Evaluation of Materials and Products](#)

¹ This guide is under the jurisdiction of ASTM Committee E18 on Sensory Evaluation and is the direct responsibility of Subcommittee E18.06 on Food and Beverage Evaluation.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[E1871 Guide for Serving Protocol for Sensory Evaluation of Foods and Beverages](#)

3. Terminology

3.1 For definitions of terms relating to this standard, see Terminology [E253](#).

4. Significance and Use

4.1 This guide outlines considerations for selecting assessors who will evaluate alcoholic beverages and recommends procedures for the evaluation of specific alcoholic beverages.

4.2 This guide gives practical suggestions to maximize assessor safety and minimize the liabilities of the person or corporation responsible for administering sensory evaluations of alcoholic beverages, while recording assessors' responses to those beverages using sound scientific principles.

4.3 This guide provides examples of informed consent forms for both Central Location Tests and Home Use Tests (see [Appendix X2 – Appendix X4](#)).

5. Safety

5.1 *Medical Condition*—Potential assessors must be in good medical condition with no serious health problems. Inform them that they should not participate on panels if they are taking prescription or over-the-counter medications that are contraindicated when combined with alcohol. It is recommended that women who are pregnant, may be pregnant, trying to become pregnant, or nursing should not participate. Recruiting should be conducted in such a way to ensure that those not meeting these medical requirements are excluded from participation.

5.2 A sufficient waiting period should be arranged before assessors are allowed to drive or operate heavy machinery after sampling test product(s).

5.3 All products should be stored in a place where they are only accessible to individuals of legal drinking age.

5.4 *Recommended Serving Volumes:*

5.4.1 Alcohol is measured in units of standard drinks. However, the amount of alcohol in a standard drink differs between countries, so caution should be taken if sensory testing

is being conducted across different countries (1, 2).³ It is easiest to convert between different countries' standard drinks using grams (3). See Table 1 for examples of standard drink amounts from six different countries.

5.4.2 Standard drink equivalents are a unit of measurement frequently used to help consumers more easily understand the units of alcohol consumed. In the United States the standard drink of 14 grams of alcohol is 355 mL (12 oz) of 5 % beer, or 148 mL (5 oz) of 12 % wine, or 44 mL (1.5 oz) of 40 % distilled spirit (4). For several countries, the standard drink amount and the equivalent standard drink in the United States can be found in Refs. (3) and (5); examples for six countries are given in Table 1 (3, 5).

5.4.3 Limit the sample volume for evaluation to an amount which will ensure the respondent will not have a Blood Alcohol Concentration (BAC) greater than the legal limit in the testing locale.

5.4.3.1 BAC levels are either reported as the mass of alcohol per volume of blood (for example, United States, France, and Poland) or the mass of alcohol by mass of blood (for example, Norway and Russia). It is important to understand the units of BAC and know the BAC legal limit in countries, and regions within those countries, in which a sensory study is being conducted (6).

5.4.3.2 Tables 2 and 3 indicate how to calculate the BAC for males and females, respectively, based on the person's weight and number of drinks consumed (7). It can be used to calculate the number of samples that can be served to assessors during a testing session.

5.4.4 Recommended serving volumes based on alcohol content can be calculated using the formula:

$$SV1 = \frac{SA2 \times SV2}{SA1} \quad (1)$$

where:

- SA1 = sample alcohol content,
- SV1 = total volume to be given to assessors = unknown,
- SA2 = "standard drink" alcohol content, and
- SV2 = "standard drink" volume.

NOTE 1—See Appendix X1 for further explanation and worked examples using the formula.

5.4.4.1 If sample volume would result in a BAC above the legal limit, testing should occur over multiple days.

5.4.4.2 Assessors should not have consumed alcohol the day on which they are participating in a sensory test containing alcoholic beverages.

5.4.5 If possible, sensory testing should occur earlier in the day to allow a waiting period if assessors are driving after testing and need time for their BAC to reduce.

5.4.5.1 After drinking ceases, the BAC increases for a short amount of time, then it slowly decreases at a rate of approximately 0.015 to 0.02 % per hour (see Table 4) (7, 8).

(I) Example: a 150 lb female consumes two drinks resulting in a BAC of approximately 0.068 %. At the most conservative elimination rate of 0.015 %, it will take 4.5 hours after the drinking session for her BAC to go from ~0.068 to ~0.0 %. To be deemed 'sober,' BAC is required to be at 0.0 and legal levels of BAC for operating a vehicle vary by country and locale and can be as low as 0.0.

5.4.5.2 In cases when a waiting time is not attainable, or in locations where no amount of alcohol is deemed acceptable for driving, public transportation, a taxi, or a designated driver should be arranged.

5.4.5.3 Consideration should also be given to how much alcohol may cause impairment, even if an assessor's BAC is below the legal limit. Some individuals are more sensitive to the effects of alcohol and so both BAC and impairment limits should be considered when serving samples.

5.4.6 If there are concerns about assessors' BAC before or after consuming products, their BAC may be measured, for example, with a breathalyzer.

5.5 When using employees as assessors, special consideration must be taken when their work involves the operation of equipment or any work task that can jeopardize the safety of others. Either do not allow these employees to be assessors or arrange with employee management "waiting times" after product evaluation before these employees can resume work involving these safety-related work activities.

5.5.1 Consider serving fewer samples so the assessor's BAC is less than the legal limit if they drink alcohol every day as a function of their work.

5.6 Safety Data Sheets (SDS) for ethanol should be stored on the study site premises and made available upon request to participants. Additionally, SDS should be available for compounds used as reference standards or for sensory training.

5.7 Additional resources specific to understanding the effects of age, weight, gender, and food consumption on rate of BAC change over time can be found in Ref. (9).

6. Regulatory and Legal Liability

6.1 Investigate and meet country, state/provincial, and local regulations whenever studies on alcoholic beverages are to be conducted. Note that the type of alcoholic beverage (beer/malt, wine, or spirit) may influence the regulatory requirements or the government agency that has jurisdiction.

6.2 Look for regulatory information through government agencies. Some examples include:

6.2.1 *Australia*—Food Standards Australia New Zealand, Australian Taxation Office (ATO) (10, 11).

6.2.2 *Chile*—Servicio Agrícola y Ganadero (SAG) (12).

6.2.3 *France*—Republique Francaise Service-Public (13).

6.2.4 *Japan*—National Tax Agency (14).

³ The boldface numbers in parentheses refer to the list of references at the end of this standard.

TABLE 1 Grams Alcohol in Standard Drink for Six Countries

Country	Standard Drink Amount (g of Alcohol)
Australia	10
Chile	14
France	12
Japan	19.75
South Africa	11.5
United States	14

TABLE 2 Blood Alcohol Concentration (BAC, %) Chart for Males

Weight (lb)	Number of Standard USA Drinks ^A Consumed									
	1	2	3	4	5	6	7	8	9	10
100	.043	.087	.130	.174	.217	.261	.304	.348	.391	.435
125	.034	.069	.103	.139	.173	.209	.242	.278	.312	.346
150	.029	.058	.087	.116	.145	.174	.203	.232	.261	.290
175	.025	.050	.075	.100	.125	.150	.175	.200	.225	.250
200	.022	.043	.065	.087	.108	.130	.152	.174	.195	.217
225	.019	.039	.058	.078	.097	.117	.136	.156	.175	.195
250	.017	.035	.052	.070	.087	.105	.122	.139	.156	.17

^A One standard USA drink of 14 grams of alcohol is 355 mL (12 oz) of 5 % beer, or 148 mL (5 oz) of 12 % wine, or 44 mL (1.5 oz) of 40 % distilled spirit.

TABLE 3 Blood Alcohol Concentration (BAC, %) Chart for Females

Weight (lb)	Number of Standard USA Drinks ^A Consumed									
	1	2	3	4	5	6	7	8	9	10
100	0.05	0.101	0.152	0.203	0.253	.304	.355	0.406	.456	.507
125	0.04	0.08	.120	0.162	0.202	0.244	0.282	.324	.364	.404
150	0.034	0.068	0.101	0.135	0.169	0.203	0.237	.271	.304	.338
175	0.029	0.058	0.087	0.117	0.146	0.175	0.204	.233	.262	.292
200	0.026	0.05	0.076	0.101	0.126	0.152	0.177	.203	0.227	.253
225	0.022	0.045	0.068	0.091	0.113	0.136	0.159	.182	.204	0.227
250	0.02	0.041	0.061	0.082	0.101	.122	0.142	.162	.182	.2

^A One standard USA drink of 14 grams of alcohol is 355 mL (12 oz) of 5 % beer, or 148 mL (5 oz) of 12 % wine, or 44 mL (1.5 oz) of 40 % distilled spirit.

TABLE 4 Amount of Time to Reduce BAC (mg of alcohol per 100 mL of blood)

Hours since first drink	1	2	3	4	5	6
Subtract from BAC	.015	.030	.045	.060	.075	.09

6.2.5 *South Africa: Department of Agriculture, Land Reform, and Rural Development (15).*

6.2.6 *United States—Federal Tax and Trade Bureau (TTB), state/local Alcohol Beverage Commissions (ABCs), Food and Drug Administration (FDA), and Occupational Safety and Health Administration (OSHA) (16-18).*

6.2.7 Samples for testing should be processed in such a way as to ensure taxes are being paid properly.

6.3 Research and meet regulations for all aspects related to the sensory testing of alcoholic beverages, including:

6.3.1 Obtaining permits and filling required documents.

6.3.2 Preparing facility, such as posting government warnings for the consumption of alcoholic beverages on test premises.

6.3.3 Labeling of products. Some examples include mandatory disclosures on packaging, labelling each product container individually, or applying a “not for resale” label for Home Use Testing products.

6.3.4 Shipping and handling of samples including customs clearance if product is being shipped between regions or internationally.

6.3.5 Product procurement, such as any requirements that products must be purchased in the same regulatory jurisdiction (for example, product must be purchased in the state that it will be tested), and if prototypes can be tested or not.

6.3.6 Receiving product.

6.3.7 Storing product.

6.3.8 Serving product:

6.3.8.1 Alcohol serving certifications or use of a certified bartender may be required for those serving alcohol.

6.3.9 Serving food, which may be required in some locations but prohibited in others.

6.3.10 Travel of assessors, may require a designated driver or that assessors take a breathalyzer before, after or both for participation.

6.3.11 Disposing of unused packages.

6.4 Research and meet requirements on types of testing allowed which may also vary among locales in which testing is being conducted. Each of these may be allowed with or without compensation:

6.4.1 Testing with consumers at a market research or sensory product testing facility.

6.4.2 Testing with consumers at a bar.

6.4.3 Testing with consumers in their home.

6.4.4 Testing using employees.

6.4.5 Testing using trained panelists.

6.4.6 Testing with bartenders.

6.5 Ethical review boards may be considered or required for example, Internal Review Board in the United States or a company’s legal department.

6.6 There is a risk of legal liability whenever alcoholic beverages are tested. To minimize these risks, it is recommended that a consent form be used for each product evaluation session or test. These may be required in some locales. Below is the information that should be in the consent form. Examples are provided in [Appendix X2 – Appendix X4](#).

6.6.1 Describe the nature of the study. For example, the sentence, “You may or may not be served beverages that contain alcohol,” can be used to obtain informed consent.