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Standard Guide for Descriptive Analysis of Shampoo Performance¹

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1. Scope

1.1 The objective of this guide is to provide procedures which may be used in the design, execution, and analysis of studies to quantitatively assess the objective sensory attributes of shampoos. This is one of many appropriate techniques used in the hair-care industry. These attributes can then be used to define performance of shampoos and to provide direction in product formulation, research guidance testing, and claim substantiation. This guide includes the sensory properties involved in dispensing a product, as well as the attributes pertinent to shampooing tresses, half and whole heads. Although this guide is specific to shampoos, the procedures should be applicable to most hair-care products.

1.2 Guidelines are provided for the definition of terminology, procedures for manipulation of products, identification/selection of hair type, and judge training. References for rating scales are not provided in this guide. The user should be aware that some sensory practices may require the use of attribute references (anchors) when training the judges.

2. Referenced Documents

2.1 ASTM Standards:

E 253 Terminology Relating to Sensory Evaluation of Materials and Products²

2.2 Other Documents:

ASTM Manual 26 Sensory Testing Methods: Second Edition³

ASTM STP 758 Guidelines for the Selection and Training of Sensory Panel Members³

ASTM Manual 30 Relating Consumer, Descriptive, and Laboratory Data to Better Understand Consumer Responses³

ASTM Manual 13 Descriptive Analysis Testing for Sensory Evaluation³

21 CFR 50.25⁴

¹ This guide is under the jurisdiction of ASTM Committee E18 on Sensory Evaluation of Materials and Products and is the direct responsibility of Subcommittee E18.07 on Personal Care and Household Evaluation.

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² Annual Book of ASTM Standards, Vol 15.07.

³ Available from ASTM Headquarters, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959.

⁴ Code of Federal Regulations, available from U.S. Government Printing Office, Washington, DC 20402.

3. Terminology

3.1 Definitions:

3.1.1 *cosmetologist*—a licensed, trained professional who has been certified by state or government agencies to apply hair-care products to human heads. These individuals may be alternately described as beauticians, stylists, hairdressers, or cosmetologists.

3.1.2 *subjects*—those individuals recruited to participate in a study for the quality or condition of their hair, to serve as sample carriers.

3.1.3 *trained panel*—a group of judges who have been formally trained to evaluate the visual and tactile properties of shampoo or hair, using a standard descriptive analysis method which quantifies attributes on a rating scale over a set time period. The number may vary depending on the complexity of the test and the skill of the judge.

4. Equipment

4.1 The following equipment may be used during the evaluation process:

4.1.1 General:

4.1.1.1 *Light Source*—A consistent light source is recommended for use during evaluation of shine or luster. It is important to control the amount of light as well as the angle and distance from the hair.

4.1.1.2 *Water Source*—Temperature and hardness should be consistent. If controlled temperature sinks are used, they should all have the same, consistent flow rate.

4.1.1.3 *Blow Dryer*—Specifications should be documented (that is, wattage, voltage, power level, air velocity, and temperature).

4.1.1.4 *Syringes/Pipettes, Petri Dishes.*

4.1.1.5 *Towels* (cloth or paper, or both).

4.1.1.6 *Combs*—It is recommended that all combs be identical in material and construction (that is, tooth length, thickness, and distance between teeth). They should be appropriately cleaned before each use. For evaluations on subject heads, combs must be sanitized properly prior to use with each test subject.

4.1.1.7 *Thermometer.*

4.1.1.8 *Hygrometer.*

4.1.2 *Additional Equipment for Evaluation on Tresses:*

4.1.2.1 *Hair Tresses* (also commonly referred to as swatches) (see Section 8 for preparation procedure).

4.1.3 *Additional Equipment for Evaluation on Subjects (Salon Setting)*:

4.1.3.1 *All-Purpose Styling Chair*.

4.1.3.2 *Capes*.

4.1.3.3 *Wet/Dry Sanitizers*.

5. Summary of Guide

5.1 This guide provides guidelines for the identification, selection, and training of judges, using a common procedure, so they may effectively evaluate the sensory attributes of shampoos and the effects of their use on hair. This guide describes the evaluation using hair tresses and subjects (half and whole heads).

5.2 During tress evaluation, a panel of trained judges treats hair swatches with the shampoo products, and evaluate the appearance, product pick-up, application, foaming, and wet hair and dry hair attributes of the shampoo.

5.3 Evaluations using live subjects are typically performed in a salon-type setting. In some cases, the services of a licensed cosmetologist may be required by state or local law. Licensed cosmetologists may bring an expanded frame of reference and may be trained as descriptive judges. Many of the attributes evaluated on subject heads are similar to those evaluated on tresses.

5.4 A comparative overview highlighting the characteristics of shampoo evaluation using tresses and using live subjects is provided in the following chart:

Comparative Overview of Shampoo Testing Using Trained Evaluators Tresses versus Subjects	
Tress	Subject: Half or Whole Head
Highly Controlled Testing:	Less Controlled:
- Controlled procedure, limited variability - Uniform hair samples (typically commercially blended "virgin" hair) - Often may purchase/create desired/target hair types	- Controlled procedure but highly variable hair/scalp types and conditions (length, diameter, oiliness, dirtiness, damage, etc.) - In special cases, may screen/target specific hair types
Artificial:	Less Artificial:
Lack scalp/sebum involvement, packing/scalp orientation effects, single hair type represented	Scalp/sebum involvement, packing/whole-head effects, usually incorporates a range of hair types/conditions
Initial Investment:	Initial Investment:
- Lower capital requirements per station - Controlled environment should include controlled lighting, water flow, and individual panelist stations - Several approaches available, varying in sophistication and expense - Depending on testing volume and scheduling, may require a greater total number of stations	- Higher capital requirements per station - Requires suitable salon-style facilities/stations with controlled lighting, water flow, etc. - May require fewer total stations
Initial Training and Maintenance:	Initial Training and Maintenance:
Variable, but probably grossly similar for tress and subject testing	Variable, but probably grossly similar for tress and subject testing
Lower Cost for Testing:	Higher Cost for Testing:
- Judge fees, consumables (syringes, etc.) - Hair reuseable over extended periods	- In addition to judges fees and consumables; there are subject fees, recruiting costs - May require services of a licensed cosmetologist for some types of testing
Sample Turn Around:	Sample Turn Around:

Comparative Overview of Shampoo Testing Using Trained Evaluators Tresses versus Subjects

Tress	Subject: Half or Whole Head
Rapid testing, high throughput, judges available as needed — little to no lead time	Less rapid testing, judges available, but may require additional lead time for subject recruiting
Evaluations/Evaluators:	Evaluations/Evaluators:
Typically requires fewer total evaluations but more (minimum of 7 to 10) evaluators, usually 2 or more reps/product	- Requires more total evaluations (subjects), but may require fewer trained panelists (see 10.1) - Simultaneous descriptive and subject self-assessment possible

6. Significance and Use

6.1 The methods outlined in this guide can be used to qualitatively and quantitatively describe the performance and sensory characteristics of shampoos.

6.2 The methods described in this guide may be used for product formulation and research guidance as well as for quality control.

6.3 These methods may be used by individuals who familiarize themselves with these procedures and who have previous experience with sensory evaluation.

6.4 Variables that may affect results include, but are not limited to, water conditions (for example, hardness), hair type, and hair condition. These variables should be controlled or accounted for in the experimental design.

6.5 These are suggested procedures and are not intended to exclude alternate methods, which may effectively provide the same or similar results.

7. Trained Panel Selection and Descriptive Training

7.1 The objective is to select and train judges to evaluate the visual and tactile properties of shampoos on hair tresses using a descriptive analysis method. The selection process should include the principles embodied in ASTM STP 758. The task of the judge is to describe product and hair attributes by rating the perceived quantity and quality of specified attributes.

7.2 Trained Panel Selection:

7.2.1 Panelists may be recruited from within the company, or from the local community. The use of licensed cosmetologists as trained panelists adds an additional qualification to the community recruit.

7.2.2 The choice to use internal employees allows a company to have panelists on site and control proprietary information. It may, however, create potential resource and scheduling conflicts, since panel evaluation will not be the employees' primary job focus.

7.2.3 The use of local community residents allows the company to schedule more panel time per week and may lower the risk of losing panelists. A large pool of potential judges is usually available.

7.2.3.1 A screening questionnaire is recommended to determine availability, interest, general knowledge of tactile properties, ability to use descriptive words, and ability to use rating scales. Some questions on the screening questionnaire relate to previous and current employment. These questions may conflict with individual company policy (see Table 1).

7.2.4 With specific training, licensed cosmetologists may represent a special type of descriptively trained panelist. In some states, licensing is required to apply certain hair-care products to live models (subjects). Information concerning this



TABLE 1 Screening Questionnaire

Name _____ Phone No. _____

Address _____
(city/state) (zip code)

GENERAL:

- Are you currently employed outside the home? Yes () No () If yes, what hours and days do you work _____
- Are there any weekdays (Monday through Friday) that you are NOT available on a regular basis? Please list the hour(s) and day(s) you are committed: _____
- Do you have your own transportation? Yes () No ()
- Do you or any member of your immediate family work for a consumer product manufacturer, a marketing research firm, or advertising company?
Yes () No ()

HEALTH:

- Have you ever had an allergic or adverse reaction to a shampoo, hair rinse, soap, or any hair-care or cleanser product? Yes () No () If yes, please describe _____
- Do you have any of the following?

	Yes	No
Psoriasis	()	()
Eczema	()	()
Central nervous system disorder	()	()
Unusually cold or warm hands	()	()
Skin rashes	()	()
Calluses on hands/fingers	()	()
Hypersensitive skin	()	()
Tingling in the fingers	()	()
- List the name of any medications you are currently taking: _____

TOUCH QUIZ: (please answer each question in your own words)

- What tactile characteristics of a lotion would make you think it is rich? _____
- What is thicker, an oily or greasy film? _____
- When you rub an oily film on your skin, how do your fingers move?
Slip _____ or Drag _____ (check one)
- What properties make a tissue feel soft? _____
- How might the appearance of a hand creme influence your perception of the feel of it? _____
- Name some things that are sticky? _____
- When your skin feels moist, what other words or properties could describe it? _____
- Name some things that are rough _____
What makes them rough? _____
- Briefly, how would you define absorbent in a lotion? _____
- What properties make a deodorant feel sticky? _____