WI 220808.01

T 483

BALLOT NO. 03 SARG

DRAFT NO. 02

DATE 6/1/2023

WORKING GROUP CHAIR Chris Czyryca

SUBJECT CATEGORY Physical Properties

RELATED METHODS See "Additional Information"

CAUTION:
This Test Method may include safety precautions which are believed to be appropriate at the time of publication of the method. The intent of these is to alert the user of the method to safety issues related to such use. The user is responsible for determining that the safety precautions are complete and are appropriate to their use of the method, and for ensuring that suitable safety practices have not changed since publication of the method. This method may require the use, disposal, or both, of chemicals which may present serious health hazards to humans. Procedures for the handling of such substances are set forth on Safety Data Sheets which must be developed by all manufacturers and importers of potentially hazardous chemicals and maintained by all distributors of potentially hazardous chemicals. Prior to the use of this method, the user must determine whether any of the chemicals to be used or disposed of are potentially hazardous and, if so, must follow strictly the procedures specified by both the manufacturer, as well as local, state, and federal authorities for safe use and disposal of these chemicals.

Odor of packaging materials

(Proposed WITHDRAWAL of Classical Method T 483 cm-12)

(Underscores, notes, and strikethroughs show changes from Draft 1)

1. Scope

The presence of foreign or objectionable odors in packaging materials which are to be used near food, drugs, etc., may be a serious matter. The determination of the type and source of the odor, and the level, is the objective of this test procedure. The most sensitive instrument presently available is the trained human nose, and the significance of test results will be directly proportional to the ability of a test panel organized for the purpose.

2. Test panel

2.1 The test panel shall consist of a test director and four to eight members. These preferably should be scientifically trained, with some knowledge of chemistry, selected carefully from those who have demonstrated an acute and discerning sense of smell, and preferably with experience covering a variety of types of odors. Nontechnical personnel have proved to be excellent panel members after suitable training. In general, the individuals of a test panel should accord with the average of the entire panel and consistent disaccord is a basis for replacement. Any members with respiratory infection should be omitted, since sensitivity is thereby impaired. The senses of taste and odor are closely allied and members of the panel should also be tested thoroughly for taste sensitivity and differentiation. Taste is a useful method of detecting odors, as described in Section 6.

2.2 The references should be consulted for further information on selection and training of panel members.

3. Apparatus

3.1 *Sample containers.* Vapor-proof containers may be necessary for sampling, storage, and holding specimens for the development of maximum intensity of odor. Friction-top metal cans, Mason jars, and laboratory glassware are suitable. Containers shall be clean, dry, and free from odor. Aluminum foil or cellophane shall be substituted for any rubber gaskets or stoppers. Samples may also be wrapped directly in foil, cellophane, vegetable parchment, HDPE, etc.

3.2 *Testing room.* Detection of low levels of odor requires working space in which individual members of the panel can concentrate. The room must be free from plant or industrial odors, and to avoid this it may be necessary to take samples home at night. Extremes of temperature should be avoided, except in special cases, and all distracting influences should be minimized.

4. Materials

4.1 *Standard samples.* In some instances, standard samples, representing satisfactory and maximum permissible levels of odor, may be set up. Maintenance of the samples is a serious problem, since age and other factors may alter odors drastically. In all cases, it is desirable to have some type of reference sample available.

4.2 *Water (odor-free).* Moisture is commonly used to intensify odors or to develop potential odors. Normally, tap water is satisfactory, except where residual odor or a chlorine smell is present. Distilled water is not always odorless. Each portion of water shall be smelled and tasted before acceptance.

4.3 *Fatty materials.* A range of substances containing oil or fat may be used to pick up certain types of odors, with identification and degree of odor determined by smell. Common materials are mineral oil, milk chocolate, cream, and fresh, unsalted butter.

5. Test specimen

5.1 The preparation of the test sample for presentation to the panel is very important. No one method of doing this is sufficient, since the type of materials under test and the possible odors present allow a wide range of possibilities. A few of the methods which have been used are given below as a guide; others may be devised as necessary. Each laboratory should develop and record the detailed preparation procedure found satisfactory for specific products.

5.2 *Direct testing.* Cut or tear representative samples of the packaging materials to a convenient size. It is often desirable to open up fresh surfaces at the instant of smelling (tearing paperboard, scraping wax with a knife, breaking open a glue joint, etc.).

5.3 *Moistening.* Water brings out some types of odors. By various mechanisms, and especially when the product may be subjected to moisture, try one of the following:

5.3.1 *Breathing on sample.* The tester exhales on the specimen, then smells it.

5.3.2 *Dampening.* Sprinkle the sample lightly with water, then smell. Time is sometimes required to develop an odor. Normally the specimen is dampened, stored at 70° to 80°F (21° to 27°C), or at 100°F (37.8°C), in an odorless glass jar for 24 h, then tested.

5.3.3 *Soaking.* Saturate or submerge the specimen in water for a period of time and at a temperature judged suitable for each case. Test by smelling both the water and the specimen.

5.4 *Transfer to oily product*

5.4.1 Place the specimen in a covered glass dish adjacent to but not in contact with mineral oil for 4 to 24 h at room temperature. Oil-soluble materials such as printing ink odor, kerosene, etc., can be detected by smelling the oil.

5.4.2 Prepare three sandwiches with a pat of unsalted butter between two pieces of the specimen and overwrap with parchment, cellophane, HDPE, etc. Hold for 1, 2, and 3 days, respectively, at room temperature; refrigerate for 30 min; then smell the butter. In preparing the reference sample, use odor-free parchment.

5.4.3 Place the folded sample in a watertight tray and add an inch (25 mm) depth of coffee cream (18% butterfat). Cover with aluminum foil, hold at 45°F (7.2°C) for 24 h, then smell the cream. This procedure has been used widely for printing-ink odors and is very sensitive. As an alternative, strips of material may be placed in a dish or flask and covered with cream. Run a blank test on the cream in a glass bottle with a foil cap.

5.4.4 Place the specimen in a covered glass dish adjacent to a piece of plain milk chocolate, and hold at room temperature for 1 to 2 days. Smell the chocolate and compare with a control.

5.4.5 Prepare a package by wrapping some commercial product, known to be sensitive to odor, with the specimen material. Hold for the desired time and temperature, then smell the product in comparison with a control.

6. Procedure

6.1 Identify all samples only by code numbers, including the control, and the panel director shall give the testers only the minimum amount of information prior to the test. The panel director shall give each member a set of specimens and a report form. Each tester shall work independently. Table 1 may serve as a procedural guide.

6.2 If the average rating is over the previously agreed rejection point (generally 2), make a check test, preferably using different panel members.

Table 1. Common packaging material odors and detection methods

Material	*Type of odor*	*Test method*
Synthetic film	Inherent, solvent, plasticizer	5.2 (24 h at 37.8°C). 5.4.1, 5.4.5
Paper and board	Inherent kraft	5.2, 5.3.1, 5.3.2
	Musty or moldy (groundwood, old news, waste)	5.2, 5.3.1, 5.3.2 (4 h at 37.8°C)
	Chlorinated phenol (additive for slime control)	5.2, 5.3.3
	Sour (decomposed starch)	5.2, 5.3
Paper, coated	Volatile additives, casein decomposition	5.2
Glassine, coated	Inherent in coating; solvent, plasticizer	5.1 (24 h at 37.8°C), 5.4.1, 5.4.5
Ink and varnish	Oxidizing oils, plasticizer, solvent	5.2, 5.4.3
Adhesive joints (after thorough drying)	Solvents, sour starch, added perfume	5.2 (fresh and after 24 h at 37.8□C)

Wax	Oil, residual oxidized solvent	5.2 (fresh shavings at room temperature in small container), 5.4.5 (cheese, for example)

7. Report

7.1 *Unknown odor.* Each individual panel member shall report the type of odor (oil, solvent, musty, etc.), its chemical nature, and (if possible) origin. Complete agreement by the panel on type of odor cannot be expected, but with experience the group report will serve as valuable data.

7.2 *Known odor.* When the odor is familiar or is established, each individual panel member shall rate the coded samples numerically according to Table 2. Intermediate ratings, e.g., 2.5, may be made where increased sensitivity is possible.

CAUTION: Because this is a subjective test, panel evaluation of odors are subject to change. Any results may or should be used only as a guideline or indication only.

Table 2. Odor ratings

Odor	*Ratings*
Essentially none (pleasant)	1
Slight but not objectionable (neutral)	2
Moderate, objectionable (unpleasant)	3
Strong (offensive)	4

NOTE 1: The decision between "slight" or "not objectionable" and "moderate" or "objectionable" will obviously depend upon the product tested, the functional requirement, and the experience of the test panel. The objectionable odor level must be *remembered*, with some help from standard samples.

Tabulate the individual ratings and, if possible, average them. Record the exact procedure followed.-

NOTE 2: After all the test results are in, it is usually desirable to review individual reports in a group meeting for educational purposes.

8. Precision

Repeatability and reproducibility do not apply to this test method since individual ratings are used as measurements.

9. Keywords

Odors, Packaging materials, Food boards, Food wrap papers

10. Additional information

10.1 Effective date of issue: To be assigned.

10.2 This method, formerly T 483 sm-53, has been reclassified as a Classical Method. Such procedures are no longer in common use or have been superseded by advanced technology; they are technically sound, have a history of use, and contain a body of literature references that make their preservation valuable. Only editorial changes were made to the 2012 version. Standard was reconfirmed as a Classical Method in 2022 with only an editorial change.

Deleted: superceded

10.3 This method was developed in cooperation with a committee of the Packaging Institute.

References

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2. Sjöström, L.B., "Paper Package Odors," *Modern Packaging* **23** (12): 118 (1950).
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5. Cartwright, L.C., and Kelley, P.H., "Organoleptic Evaluation of Paper Products for Food Packaging," *Tappi* **35** (7): 306 (1952); *Modern Packaging* **25** (11): 145, 201 (1952).
6. Crocker, E.C., "The Nature of Odor," *Tappi* **35** (7): 169A (1952).

Your comments and suggestions on this procedure are earnestly requested and should be sent to the TAPPI Standards Department.