



Designation: F34 – 02(Reapproved 2007)

Standard Practice for Construction of Test Cell for Liquid Extraction of Flexible Barrier Materials¹

This standard is issued under the fixed designation F34; 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 covers the construction of test cells which may be used for the extraction of components from flexible barrier materials by suitable extracting liquids, including foods and food simulating solvents.

1.2 *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:*²

D1193 Specification for Reagent Water

2.2 *AOAC International Methods of Analysis:*

Extractives from Flexible Barrier Materials³

2.3 *Code of Federal Regulations:*

Title 21, Sections 176.170⁴

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *flexible*—for purpose of this practice, a term applying only to those flexible materials which can be inserted in the test cell without affecting their barrier properties.

4. Significance and Use

4.1 Knowledge of extractives from flexible barrier materials may serve many useful purposes. A test cell constructed as

¹ This practice is under the jurisdiction of ASTM Committee F02 on Flexible Barrier Packaging and is the direct responsibility of Subcommittee F02.15 on Chemical/Safety Properties.

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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.

³ This method is available through the Association of Official Analytical Chemists, International, 481 North Frederick Ave., Suite 500, Gaithersburg, MD 20877–2417.

⁴ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, http://www.access.gpo.gov.

described in this practice may be used for obtaining such data. Another test cell has been found equivalent to the one described in this practice. See the appendix for the source of the alternate cell.

5. Reagents and Materials

5.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.⁵ Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

5.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent grade corresponding to Specification D1193.

5.3 *n-Heptane*, boiling point specified as 208°F (97°C), freshly distilled.

6. Procedure

6.1 *Construction of Test Cell* (Fig. 1, Fig. 2)—Assemble as follows:

6.1.1 Two 8 by 11 $\frac{3}{8}$ by $\frac{1}{8}$ -in. (203 by 289 by 3.2-mm) No. 316 stainless steel plates, degreased.

6.1.2 One $\frac{1}{4}$ by 1 $\frac{1}{2}$ -in. (6.4 by 38-mm) U-shaped virgin TFE-fluorocarbon gasket, grooved on both sides as shown.

6.1.3 Twelve $\frac{1}{4}$ by 1-in. (6.4 by 25.4-mm) stainless steel bolts with wing nuts.

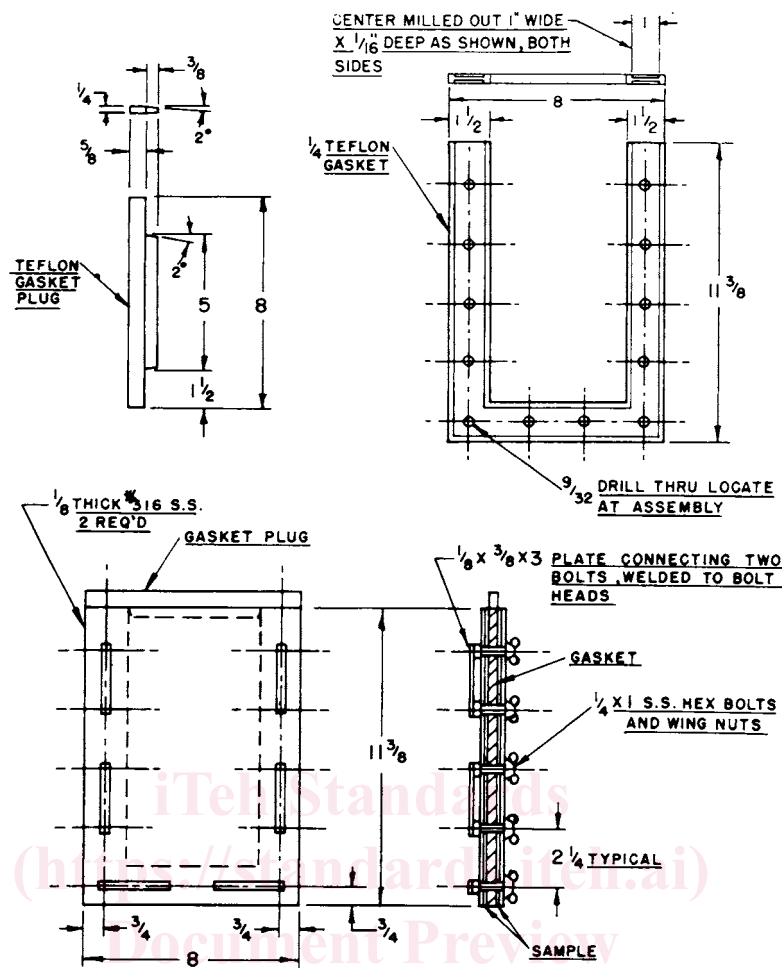
6.1.4 One $\frac{1}{4}$ by 1 by 8-in. (6.4 by 25.4 by 203-mm) TFE-fluorocarbon gasket plug tapered to provide a tight fit.

6.1.5 Six $\frac{1}{8}$ by $\frac{3}{8}$ by 3-in. (6.4 by 9.5 by 76-mm) plates.

NOTE 1—The use of stainless steel washers on the outside of each plate (6.1.1) may prevent the cells from leaking.

6.2 Pre-Use Conditioning of Test Cell:

⁵ *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.



SI Equivalents

in.	mm	in.	mm	in.	mm
1/16	1.6	5/8	15.9	2 1/4	57
1/8	3.2	3/4	19	3	76
1/4	6.4	1	25.4	8	203
9/32	7	1 1/2	38	11 3/8	289
3/8	9.5				

FIG. 1 Test Cell Assembly

6.2.1 Wash stainless steel plates and TFE-fluorocarbon gaskets in aqueous surfactant solution. Rinse with reagent water and dry at 122°F (50°C). Wash with *n*-heptane and redistilled acetone.

6.2.2 For new TFE-fluorocarbon gaskets, immerse in *n*-heptane overnight. Rinse gaskets with fresh *n*-heptane. Dry gaskets at 122°F (50°C).

6.3 Use of Test Cell:

6.3.1 Place one stainless steel plate of the cell on a flat surface with bolts protruding up through the holes in the plate. Place a prepunched (Note 2) specimen (side to contact liquid up) on the plate with one edge of the specimen aligned with the bottom of the plate, two edges aligned with the sides of the plate, and the bolts passing through the prepunched holes. Place a TFE-fluorocarbon gasket on the specimen with the outer edges of the gasket aligned with the cell bottom and

sides. If desired, place a second prepunched specimen (side to contact liquid down) on top of the gasket. If only one specimen sheet is used for the test, place an inert barrier sheet such as TFE-fluorocarbon or clean foil in place of the second specimen. Place a second stainless steel plate on top of the assembly. Place wing nuts on the bolts and tighten.

NOTE 2—Use the cell plate as a template and any suitable sharp instrument to prepunch the specimen through the bolt holes in the plate.

6.3.2 Preheat the assembly (including the TFE-fluorocarbon gasket plug) to the test temperature and retighten the nuts so that the assembly is liquid-tight. The assembly is ready to use.

7. Keywords

7.1 flexible barrier materials; food simulating solvents; test cells