

U.S. DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
(formerly National Bureau of Standards)
OFFICE OF STANDARDS SERVICES

PRODUCT STANDARD PS39-70

**CLINICAL THERMOMETERS
(MAXIMUM-SELF-REGISTERING MERCURY-IN-GLASS)**

This commercial standard was withdrawn by the U.S. Department of Commerce, August 20, 1979.

* * * * *

The following standard was used to replace PS39-70: ASTM E667, Standard Specification for Clinical Thermometers (Maximum Self-Registering, Mercury-in-Glass).

For assistance and additional information on related standards and sources for subcommittees, contact:

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National Bureau of Standards

Voluntary Product Standard; Intent To Withdraw

In Accordance with § 10.12 of the Department's "Procedures for the Development of Voluntary Product Standards" (15 CFR Part 10), notice is hereby given of the intent to withdraw Voluntary Product Standard PS 39-70, "Clinical Thermometers (Maximum-Self-Registering, Mercury-in-Glass)."

This withdrawal action is being proposed for the reason that PS 39-70 is adequately covered by the American society for Testing and Materials' standard ANSI/ASTM E 667-79, "Standard Specification for Clinical Thermometers (Maximum Self-Registering, Mercury-in-Glass)," and duplication is inappropriate and not in the public interest.

Any comments or objections concerning this intended withdrawal of this standard should be made in writing to Standards Development Services, National Bureau of Standards, Washington, D.C. 20234 by May 4, 1979. The effective date of withdrawal will not be less than 60 days after the final notice of withdrawal. Withdrawal action terminates the authority to refer to a published standard as a voluntary standard developed under the Department of Commerce procedures from the effective date of withdrawal. For further information, contact Karl G. Newell, Area Code (301) 921-2356.

Dated: March 30, 1979.

Ernest Ambler,
Director.

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DO NOT REMOVE

NBS Voluntary Product Standard

PS 39-70

WITHDRAWN

Clinical Thermometers (Maximum-Self-Registering, Mercury-in-Glass)

**A Voluntary Standard
Developed by Producers,
Distributors, and Users
With the Cooperation of the
National Bureau of Standards**

**U.S.
DEPARTMENT
OF
COMMERCE
National
Bureau
of Standards**

**A UNITED STATES
DEPARTMENT OF
COMMERCE
PUBLICATION**



**Voluntary Product Standard
PS 39-70**

**Clinical Thermometers (Maximum-Self-Registering,
Mercury-In-Glass)**

Technical Standards Coordinator: Wm. H. Furcolow

Abstract

This Voluntary Product Standard covers the requirements and methods of testing maximum-self-registering, mercury-in-glass thermometers of the types commonly used for measuring body temperatures, such as oral and rectal types in both regular and basal temperature scales. It is intended to serve as a nationally recognized basis for certification of compliance by manufacturers and for procurement purposes by consumers. The standard includes requirements for bulb and stem glasses, mercury, dimensions, temperature scale ranges, and graduations, and performance criteria for thermometer aging, hard shaking determination, and accuracy of scale reading.

Key words: Clinical thermometers; glass thermometers, clinical; mercury-in-glass thermometers; thermometers, self-registering, clinical.

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VOLUNTARY PRODUCT STANDARDS

Voluntary Product Standards are standards developed under procedures established by the Department of Commerce (15 CFR Part 10, as amended, May 28, 1970). The standards may include (1) dimensional requirements for standard sizes and types of various products, (2) technical requirements, and (3) methods of testing, grading, and marking. The objective of a *Voluntary Product Standard* is to establish requirements which are in accordance with the principal demands of the industry and, at the same time, are not contrary to the public interest.

Development of a VOLUNTARY PRODUCT STANDARD

The Office of Engineering Standards Services of the National Bureau of Standards has been assigned by the Department of Commerce the responsibility to work closely with scientific and trade associations and organizations, business firms, testing laboratories, and other appropriate groups to develop *Voluntary Product Standards*. The Bureau has the following role in the development process: It (1) provides editorial assistance in the preparation of the standard; (2) supplies such assistance and review as is required to assure the technical soundness of the standard; (3) acts as an unbiased coordinator in the development of the standard; (4) sees that the standard is representative of the views of producers, distributors, and users or consumers; (5) seeks satisfactory adjustment of valid points of disagreement; (6) determines the compliance with the criteria established in the Department's procedures cited above; and (7) publishes the standard.

Industry customarily (1) initiates and participates in the development of a standard; (2) provides technical counsel on a standard; and (3) promotes the use of, and support for, the standard. (A group interested in developing a *Voluntary Product Standard* may submit a written request to the Office of Engineering Standards Services, National Bureau of Standards, Washington, D.C. 20234.)

A draft of a proposed standard is developed in consultation with interested trade groups. Subsequently, a Standard Review Committee is established to review the proposed standard. The committee, appropriately balanced, includes qualified representatives of producers, distributors, and users or consumers of the product being standardized. When the committee approves a proposal, copies are distributed for industry consideration and acceptance. When the acceptances show general industry agreement, and when there is no substantive objection deemed valid by the Bureau, the Bureau announces approval of the *Voluntary Product Standard* and proceeds with its publication.

Use of a VOLUNTARY PRODUCT STANDARD

The adoption and use of a *Voluntary Product Standard* is completely voluntary. *Voluntary Product Standards* have been used most effectively in conjunction with legal documents such as sales contracts, purchase orders, and building codes. When a standard is made part of such a document, compliance with the standard is enforceable by the purchaser or the seller along with other provisions of the document.

Voluntary Product Standards are useful and helpful to purchasers, manufacturers, and distributors. Purchasers may order products that comply with *Voluntary Product Standards* and determine for themselves that their requirements are met. Manufacturers and distributors may refer to the standards in sales catalogs, advertising, invoices, and labels on their product. Commercial inspection and testing programs may also be employed, together with grade labels and certificates assuring compliance, to promote even greater public confidence. Such assurance of compliance promotes better understanding between purchasers and sellers.

Clinical Thermometers (Maximum-Self-Registering, Mercury-in-Glass)

Effective October 15, 1970. (See section 7.)

(This voluntary Standard, initiated by the Standing Committee, has been developed under the *Procedures for the Development of Voluntary Product Standards*, published by the U.S. Department of Commerce, as a revision of CS 1-52, *Clinical Thermometers*. See Section 8, *History of Project*, for further information.)

1. PURPOSE

The purpose of this Voluntary Product Standard is to provide nationally recognized marketing classifications and quality requirements for clinical thermometers. It is also intended to provide producers, distributors, and users with a common understanding of the characteristics of this product.

2. SCOPE AND CLASSIFICATION

2.1. Scope—This Voluntary Product Standard covers maximum-self-registering, mercury-in-glass thermometers of the types commonly used for measuring body temperatures. Requirements are given for bulb and stem glasses, mercury, legibility and permanency of markings, dimensions, temperature scale ranges, and graduations, as well as for thermometer stability, ease of resetting, retention of temperature indication, and for accuracy of scale reading. Appropriate methods of testing to determine compliance are provided. Also included are a glossary of terms used in the Standard and an appendix with additional information on thermometer glasses and stability.

2.2. Classification—Clinical thermometers covered by this Standard are generally available in the following classifications. Other designs and configurations of thermometers meeting the requirements specified herein shall also be considered as complying with this Standard.¹

2.2.1. Types—Thermometers are classified by types as follows (see figure 1):

- a. Basal metabolism or ovulation with large cylindrical bulb (Ovulation Scale).
- b. Multi-use (oral or rectal) with stubby bulb (Regular Scale).
- c. Oral with cylindrical bulb (Regular Scale).
- d. Rectal with pear-shaped bulb (Regular Scale).

2.2.2. Stems—Thermometer stems are classified as follows (see figure 2):

- a. Flat magnifying lens.
- b. Triangular reflection magnifying lens.
- c. Triangular magnifying lens.

2.2.3. Scales—Thermometer temperature scales and ranges are classified as follows:

- a. Celsius:²
 - Regular Scale, at least 35 to 41 °C
 - Ovulation Scale, at least 35.5 to 38 °C
- b. Fahrenheit:
 - Regular Scale, at least 96 to 106 °F
 - Ovulation Scale, at least 96 to 100 °F

2.2.4. Marking—Thermometer markings are classified as follows:

- a. Etched and filled.
- b. Stained.

3. REQUIREMENTS

3.1. General—All thermometers represented as complying with this Voluntary Product Standard shall meet all of the requirements specified herein. Terms shall be as defined in section 5.

3.2. Glass—Thermometers shall be made from bulb glass and magnifying lens stem glass (glasses) having properties and characteristics which insure stability, accuracy, and reliability in accordance with the requirements of this Voluntary Product Standard. (See appendix.)

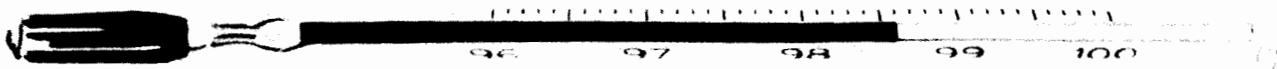
3.3. Mercury—Mercury used in the thermometers shall have the purity, properties, and characteristics that will enable the finished thermometers to comply with all the performance requirements of this Standard. In addition, when finished thermometers are visually examined, the bulb and the mercury column shall be free from gas or other foreign material.

3.4. Fabrication of regular scale thermometers

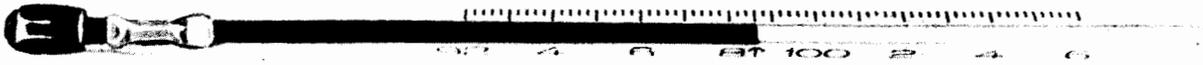
3.4.1. Length—The overall length of the thermometers shall be not less than $3\frac{7}{8}$ inches (98.4 mm).

¹The requirements of this Standard shall not preclude the manufacture and sale of special thermometers having different temperature ranges and degrees of subdivision designed for specific medical uses, such as for tuberculous cases.

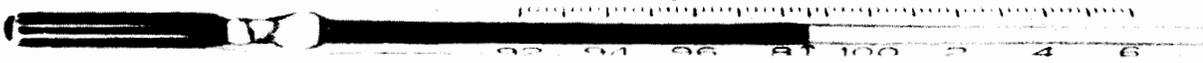
²Formerly known as "centigrade." The Celsius temperatures given in parenthesis throughout this Standard are not necessarily exact Fahrenheit conversions but are the values to be used when testing thermometers with Celsius scales for conformance with this Standard.



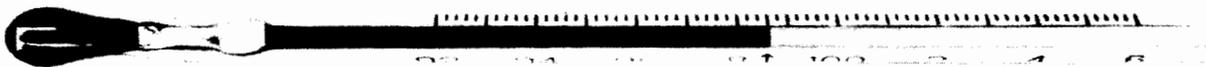
a. Basal metabolism or ovulation with large cylindrical bulb.



b. Multi-use (oral or rectal) with stubby bulb



c. Oral with cylindrical bulb



d. Rectal with pear-shaped bulb

Figure 1. Types of clinical thermometers.
(These sketches are for illustration only.)

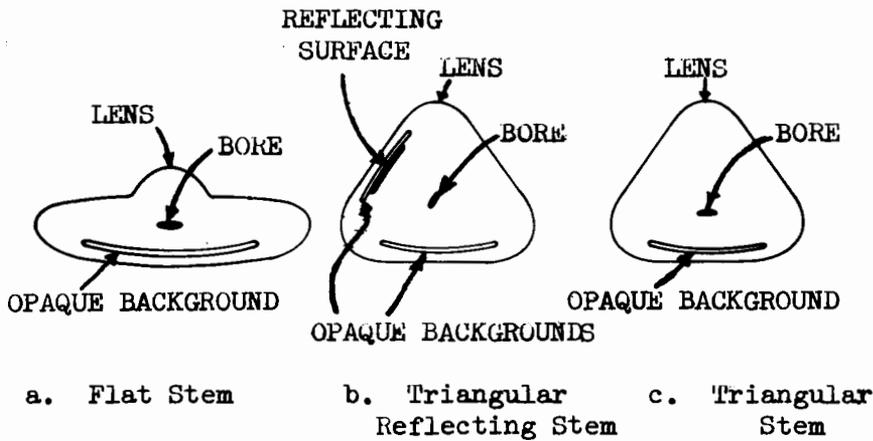
3.4.2. **Thickness of stem**—No dimension of the cross section of flat magnifying stems shall be greater than 0.30 inch (7.6 mm) nor less than 0.14 inch (3.6 mm). No dimension of the cross section of triangular stems shall be less than 0.14 inch (3.6 mm).

3.4.3. **Scale range and position**—There shall be not more than 9.0 °F (5.0 °C) per inch (25.4 mm) of temperature scale. The range of scale shall be at least from 96 to 106 °F, or from 35 to 41 °C, as applicable. The 96 °F (35.5 °C) graduation mark shall be not less than $\frac{7}{16}$ inch (11.1 mm) from the base of the mercury column. The 106 °F (41 °C) mark

shall be at least $\frac{1}{8}$ inch (3.2 mm) from the end of the bore.

3.4.4. **Fahrenheit graduations**—Fahrenheit thermometers shall be graduated in 0.2 °F intervals. All full-degree graduations and the graduation for 98.6 °F shall be long lines, and all other graduations shall be short lines (see 3.4.6). Appropriate numerals shall be placed at every even-degree graduation.

3.4.5. **Celsius graduations**—Celsius thermometers shall be graduated in 0.1 °C intervals. All full-degree and half-degree graduations shall be long lines, and all other graduations shall be short lines (see 3.4.6). Appropriate



Cross sections of magnifying lens stems.

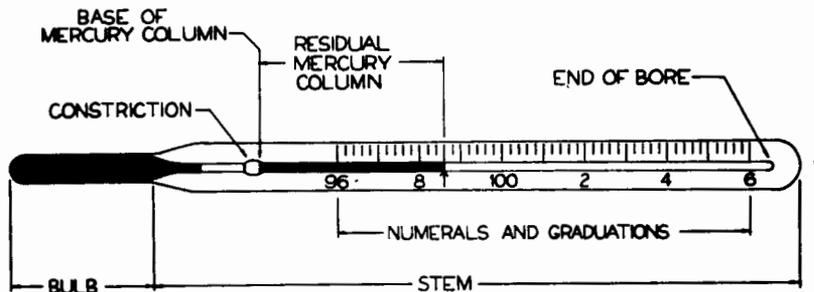


Figure 2. Composite and sectional views of clinical thermometers.
(These sketches are for illustration only.)

numerals shall be placed at every full-degree graduation except 37 °C.

3.4.6. Temperature scale graduation marks—All short graduation lines shall be not less than 0.05 inch (1.3 mm) in length, and all long graduation lines shall be at least 25 percent longer than the short lines. The graduation lines shall be substantially straight, uniformly spaced, of uniform width, and shall be perpendicular to the axis of the stem. They shall not be wider than the spaces between the graduations, nor wider than 0.018 inch (0.46 mm), and shall not be narrower than 0.004 inch (0.10 mm).

3.4.7. Normal temperature marks—The line at 98.6 °F (37 °C) shall be designated by an arrow or other suitable mark within a tolerance of plus or minus one-half of the minimum graduated interval.

3.4.8. Legibility of marks, numbers, and graduations—All temperature scale graduations and numerals and all identification marks shall be made readily legible by the use of colorant. The cumulative loss of colorant from graduation lines shall be not more than the equivalent of one long graduation line, the cumulative loss of colorant from numbers shall be not more than the equivalent of one entire

TABLE 1. Rounding of temperature readings required for certification

Celsius readings (degrees)		Round to (degrees)	Fahrenheit readings (degrees)		Round to (degrees)
From	To		From	To	
35.75	35.85	35.8	96.66	96.74	96.7
35.86	35.94	35.9	96.75	96.85	96.8
35.95	36.05	36.0	96.86	96.94	96.9
36.06	36.14	36.1	96.95	97.05	97.0
36.15	36.25	36.2	97.06	97.14	97.1
			97.15	97.25	97.2
			97.26	97.34	97.3
36.75	36.85	36.8			
36.86	36.94	36.9			
36.95	37.05	37.0	97.66	97.74	97.7
37.06	37.14	37.1	97.75	97.85	97.8
37.15	37.25	37.2	97.86	97.94	97.9
37.26	37.34	37.3	97.95	98.05	98.0
37.35	37.45	37.4	98.06	98.14	98.1
37.46	37.54	37.5	98.15	98.25	98.2
37.55	37.65	37.6	98.26	98.34	98.3
37.66	37.74	37.7			
			98.66	98.74	98.7
38.75	38.85	38.8	98.75	98.85	98.8
38.86	38.94	38.9	98.86	98.94	98.9
38.95	39.05	39.0	98.95	99.05	99.0
39.06	39.14	39.1	99.06	99.14	99.1
39.15	39.25	39.2	99.15	99.25	99.2
40.46	40.54	40.5	99.26	99.34	99.3
40.55	40.65	40.6			
			101.66	101.74	101.7
40.66	40.74	40.7	101.75	101.85	101.8
40.75	40.85	40.8	101.86	101.94	101.9
40.86	40.94	40.9	101.95	102.05	102.0
40.95	41.05	41.0	102.06	102.14	102.1
41.06	41.14	41.1	102.15	102.25	102.2
41.15	41.25	41.2	102.26	102.34	102.3
41.26	41.34	41.3	105.15	105.25	105.2
			105.26	105.34	105.3
			105.35	105.45	105.4
			105.46	105.54	105.5
			105.55	105.65	105.6
			105.66	105.74	105.7
			105.75	105.85	105.8
			105.86	105.94	105.9
			105.95	106.05	106.0
			106.06	106.14	106.1
			106.15	106.25	106.2
			106.26	106.34	106.3
			106.35	106.45	106.4

number, and the cumulative loss of colorant from letters shall be not more than the equivalent of one complete letter.

3.4.9. Permanency of marks, numbers, and graduations—When tested in accordance with 4.2, all temperature scale graduations and numerals and all identification marks shall not fade or discolor in such a manner as to impair their legibility. The cumulative loss (or fading) of colorant from graduation lines shall be not more than the equivalent of one long graduation line, the cumulative loss of colorant from numbers shall be not more than the equivalent of one entire number, and the cumulative loss of colorant from letters shall be not more than the equivalent of one complete letter.

3.4.10. Stability—Thermometers shall be stabilized by natural or artificial means to assure that the requirements of this Standard will be maintained by the thermometers while in normal use. (See appendix.)

3.4.11. Accuracy of scale reading—No individual reading on any regular scale thermometer shall be in error by more than ± 0.2 °F (0.1 °C) at 98 °F (37 °C) and 102 °F (39 °C), nor by more than ± 0.3 °F (0.2 °C) at 106 °F (41 °C), when tested in accordance with 4.3. These readings shall be rounded to one decimal place as provided in table 1.

3.4.12. Ease of resetting—The length of the residual mercury column shall not exceed $\frac{1}{16}$ inch (20.6 mm), and the top of the column shall

fall below 96 °F (35.5 °C), when tested in accordance with 4.4. (See definition for "Hard shaker thermometer.")

3.4.13. Temperature retention—Each thermometer shall indicate 106.0 ± 0.3 °F (41.0 ± 0.2 °C) when tested in accordance with 4.5. If applicable, as provided in 4.3, the acceptable indication shall be 105.6 ± 0.3 °F (40.8 ± 0.2 °C). (See definition for "Retreating index thermometer.")

3.4.14. Workmanship—Each thermometer shall exhibit creditable workmanship in order to be certified under this Voluntary Product Standard. There shall be no constructional defects which would prevent the observations of temperature within a tolerance of 0.2 °F (0.1 °C) in the range of 96 to 104 °F (35 to 40 °C), and 0.3 °F (0.2 °C) in the range of 104 to 106 °F (40 to 41 °C). The presence of unhealed fire cracks or fractures shall be considered evidence of discreditable workmanship.

3.5. Fabrication of ovulation scale thermometers—Thermometers designed for use in determining the date of ovulation or the basal metabolic rate shall meet the preceding requirements with the following exceptions:

3.5.1. Scale range and position—There shall be not more than 4 °F (3 °C) per $1\frac{1}{2}$ inch (38.1 mm) of temperature scale. The range of the scale shall be at least from 96 to 100 °F, or from 35.5 to 38 °C, as applicable. The 100 °F (38 °C) graduation mark shall be at least $\frac{1}{8}$ inch (3.2 mm) from the end of the bore.

3.5.2. Temperature scale graduations—Thermometers shall be graduated in 0.1 °F or 0.1 °C intervals. All full-degree and half-degree graduations shall be long lines, and all other graduations shall be short lines (see 3.4.6). Numerals shall identify each full-degree mark on the scale. The requirement for normal point markings shall not apply to ovulation scale thermometers.

3.5.3. Accuracy of scale reading—No individual reading on any ovulation scale thermometer shall be in error by more than ± 0.2 °F (0.1 °C) at 97 °F (36 °C), 98 °F (37 °C), and 99 °F (37.5 °C) when tested in accordance with 4.3.

3.5.4. Ease of resetting—Thermometers shall meet the requirements specified in 3.4.12, except that when tested they shall be heated to 99 ± 0.5 °F (37 ± 0.3 °C) before centrifuging. (See definition for "Hard shaker thermometer.")

3.5.5. Temperature retention—Each ovulation scale thermometer shall indicate 99.0 ± 0.2 °F (37.5 ± 0.1 °C) when tested in accordance with 4.5. (See definition for "Retreating index thermometer.")

3.6. Marking—Each thermometer represented as conforming to the requirements of this Standard shall bear in legible characters the name or trademark of the manufacturer or distributor, and a designation, either a serial number or a code, to indicate the specific period, not to exceed 90 days, in which the thermometer was calibrated. Additionally, each ovulation scale thermometer shall be appropriately marked to clearly indicate that it was designed specifically for obtaining temperatures to be used in determining the date of ovulation or the basal metabolic rate. This mark shall follow the manufacturer's or distributor's name or trademark.

4. TEST PROCEDURES

4.1. General—The inspection and test procedures contained in this section are to be used to determine the conformance of clinical thermometers to the requirements of this Voluntary Product Standard. Each producer or distributor who represents his products as conforming to this Standard may utilize statistically based sampling plans which are appropriate for each particular manufacturing process but shall keep such essential records as are necessary to document with a high degree of assurance his claim that all of the requirements of this Standard are met. Additional sampling and testing of the product, as may be agreed upon between purchaser and seller, is not precluded by this section.

4.1.1. In all tests where a temperature-controlled bath is used, all thermometers being tested shall be immersed to cover at least the bulb and the constriction.

4.2. Retention of colorant—Thermometers shall be immersed in an aqueous solution of 5 percent phenol by weight for a period of 1 hour at a temperature between 70 and 90 °F (21 and 32 °C).

4.3. Accuracy—Regular scale thermometers shall be tested for accuracy at 98.00 °F (37.00 °C), 102.00 °F (39.00 °C), and 106.00 °F (41.00 °C), and ovulation scale thermometers shall be tested for accuracy at 97.00 °F (36.00 °C), 98.00 °F (37.00 °C), and 99.00 °F (37.5 °C), by heating them to the required temperatures in a well-stirred temperature-controlled bath, removing them, and reading them. The tests at 106 °F and 99 °F may be performed concurrently with the temperature retention test described in 4.5. Thermometers not graduated above 106 °F (41 °C) may be tested at 105.6 °F (40.8 °C) to reduce the uncertainty in determining the error.

4.3.1. Manufacturers or distributors will be required to satisfactorily demonstrate to whom-ever may be concerned the accuracy and reli-

ability of their bath and temperature standards. (A calibrated standard thermometer traceable to the National Bureau of Standards is an acceptable temperature standard.)

4.4. Ease of resetting—Thermometers, after having been heated to 106 ± 0.5 °F (41 ± 0.3 °C), shall be centrifuged, bulb outward, to impart the equivalent centrifugal force of 51 ± 2 G's at a point on the thermometer $1\frac{11}{32}$ inches (34.1 mm) from the end of the bulb. The centrifuging radius (from the center of rotation to $1\frac{11}{32}$ inches [34.1 mm] from the end of the bulb) shall be at least 5 inches (127.0 mm).

4.5. Temperature retention—Regular scale thermometers shall be tested for accuracy at 106 °F (41 °C) as described in 4.3, but shall be allowed to cool slowly to 105 °F (40.5 °C) or below at a uniform rate not exceeding 1.0 °F (0.5 °C) in 3 minutes while still in the temperature-controlled bath. Ovulation scale thermometers shall be tested for accuracy at 99 °F (37.5 °C) as described in 4.3, but shall be allowed to cool slowly to 98 °F (37 °C) or below at a uniform rate not exceeding 1.0 °F (0.5 °C) in 3 minutes while still in the temperature-controlled bath. The thermometers shall then be removed from the bath and read.

5. DEFINITIONS

The terms used herein are defined as follows:

Bore—The hole or lumen in the stem.

Bulb—The reservoir at the bottom end of the stem of the thermometer which contains the mercury.

Calibration date—The date on which the scale is affixed to a thermometer.

Constriction—An obstruction in the bore of a clinical thermometer which permits the passage of mercury from the bulb when the bulb is heated, but which also restricts its passage back to the bulb when the heat is removed.

Etched—Marking the surface of glass with hydrofluoric acid or other agent.

Fire cracks—Cracks in glass caused by local temperature shock.

Flat magnifying lens—Thermometer stem glass in which the numerals, graduations, and lens lie on the same relative surface. So named for its approximately flat cross-section. (See figure 2.)

Fractures—Internal or external breaks or cracks in the glass. Internal fractures usually occur in the area between the bulb and the constriction.

Graduations—Series of lines on the stem of the thermometer which designate the temperature scale intervals.

Hard shaker thermometer—A thermometer in which the constriction is overly severe thereby unduly restricting the passage of mercury back to the bulb causing the thermometer to fail the ease-of-resetting requirements.

Index—The upper point of the mercury column whose position, when noted with respect to the corresponding numerals and graduations, indicates the temperature of the mercury within the bulb.

Magnifying lens—Stem glass which, due to its configuration, results in a magnification of the mercury column.

Normal temperature—The conventionally accepted average body temperature in healthy human beings (98.6 °F or 37 °C).

Reflecting stem—Stem glass containing a colored stripe along its length in a location which, when reflected on the mercury column, allows greater contrast and enables the column to appear tinted.

Reliability—The probability of performing without failure a specified function under normal conditions for a specified period of time.

Residual mercury column—The mercury which lies in the bore of the stem above the constriction.

Retreating index thermometer—A thermometer in which the constriction is not sufficiently small to prevent the passage of mercury back to the bulb (or the mercury index from falling) without shaking when heat is removed from the bulb.

Scale range—The range of degrees of temperature through which a thermometer is usable.

Stained—Marking the surface of glass by diffusing the colorant into the glass surface.

Stem—That portion of a thermometer which comprises the lens, numerals, and graduations and which indicates the temperature of the mercury in the bulb.

Thermometer, clinical—A mercury-in-glass thermometer designed to indicate and retain (until reset) body temperatures, including temperatures obtained for determining the date of ovulation and basal metabolic rate.

Thermometer, calibrated standard—A thermometer whose accuracy has been certified at specific points and which is used to calibrate other thermometers.

Triangular magnifying lens—Thermometer stem glass in which the numerals and graduations lie on different surfaces that smoothly merge to form a lens. It is so named for its

approximately triangular cross-section. (See figure 2.)

6. IDENTIFICATION

In order that purchasers may identify products conforming to all requirements of this Voluntary Product Standard, producers and distributors may include a statement of compliance in conjunction with their name and address on product labels, invoices, sales literature, and the like. The following statement is suggested when sufficient space is available:

This thermometer conforms to all of the requirements established in Voluntary Product Standard PS 39-70, developed cooperatively with the industry and published by the National Bureau of Standards under the *Procedures for the Development of Voluntary Product Standards* of the U.S. Department of Commerce. Full responsibility for the conformance of this product to the standard is assumed by (name and address of producer or distributor).

The following abbreviated statement is suggested when available space on labels is insufficient for the full statement:

Conforms to PS 39-70 (name and address of producer or distributor).

7. EFFECTIVE DATE

The effective date of this Voluntary Product Standard is the date upon which reference to the Standard may be made by producers, distributors, users and consumers, and other interested parties. Compliance by producers with all of the requirements of this Voluntary Product Standard may not actually occur until some time after its effective date. Products shall not be represented as conforming to this Voluntary Product Standard until such time as all requirements established in the Standard are met. The effective date of this Standard is October 15, 1970.

8. HISTORY OF PROJECT

On September 22, 1967, the Standing Committee for Commercial Standard CS 1-52, *Clinical Thermometers*, submitted a proposed revision of the Standard to the National Bureau of Standards and requested assistance in processing it for publication under the *Procedures for the Development of Voluntary Product Standards* as published by the U.S. Department of Commerce. (Previous editions of this Standard were published as Commercial Standards in 1928, 1932, 1942, and 1952.) After preliminary NBS technical review, a proposed Voluntary Product Standard was distributed to the indus-

try for comment on November 8, 1967. Much comment was received, and in the absence of a trade association of thermometer producers, the Bureau appointed a technical committee of thermometer producers, including a small producer and an importer, for the purpose of evaluating the comments and developing an acceptable revision of the Standard. The Standing Committee was reconstituted and the draft, developed in cooperation with the technical committee, was approved by the Standing Committee in June of 1970. The recommended Voluntary Product Standard dated April 10, 1970, was distributed to the industry for acceptance on July 20, 1970. The Standard was distributed to all known producers of thermometers, as well as to many wholesale and retail distributors, and to many users and general interests.

The response to this circulation indicated that the Standard was supported by a consensus as defined in the Voluntary Product Standards procedures.

Accordingly, Voluntary Product Standard PS 39-70, *Clinical Thermometers (Maximum-Self-Registering, Mercury-In-Glass)*, was approved for publication by the National Bureau of Standards to be effective on October 15, 1970.

Technical Standards Coordinator: Wm. H. Furcolow, Product Standards Section, Office of Engineering Standards Services, National Bureau of Standards, Washington, D.C. 20234.

9. STANDING COMMITTEE

The individuals whose names are listed below constitute the membership of the Standing Committee for this Standard. The function of the committee is to review all proposed revisions and amendments in order to keep this Standard up to date. Comments concerning this Standard and suggestions for its revision may be addressed to any member of the committee or to the Office of Engineering Standards Services, National Bureau of Standards, Washington, D.C. 20234, which acts as secretary for the committee.

Representing Producers

Mr. Henry P. Becton, Chairman, Executive Committee, Becton, Dickinson and Company, Rutherford, New Jersey 07070 (Chairman)

Mr. Edward A. Kessling, E. Kessling Thermometer Company, Inc., 682 Jamaica Avenue, Brooklyn, New York 11208 (Representing the American Clinical Thermometer Guild, Inc.)

Mr. Irving A. Speelman, Vice President, Propper Manufacturing Company, Inc., 10-34 44th Drive, Long Island City, New York 11101

Mr. John B. Hardin, Production Manager, Eisele & Company, Inc., 715 Massman Drive, Nashville, Tennessee 37210
Mr. Alfred Klein, Manager, Quality Control, Clinical Thermometer Division, Chesebrough-Ponds, Inc., John Street, Clinton, Connecticut 06413

Representing Distributors

Mr. Edward A. Loring, President, Gilman Brothers, Inc., 20 Freeport Street, Boston, Massachusetts 02122 (Representing the National Wholesale Druggists Association)
Mr. Robert J. Bolger, Executive Vice President, National Association of Chain Drug Stores, 1911 Jefferson Davis Highway, Arlington, Va. 22202
Mr. Willard B. Simmons, Executive Secretary, National Association of Retail Druggists, 1 East Wacker Drive, Chicago, Illinois 60601
Dr. L. C. Liberatore, Factory Manager, Consumer Products Division, Taylor Instrument Companies, Arden, North Carolina 28704

Representing Users

Mr. Vincent W. Godlesky, Purchasing Agent, Beth Israel Hospital, 330 Brookline Avenue, Boston, Massachusetts 02215 (Representing American Hospital Association)
Dr. William W. Ullmann, Laboratory Division, Connecticut State Department of Health, 79 Elm Street, Hartford, Connecticut 06115
Mr. C. S. Koons, Chief, Marketing Division, Medical-Dental-Scientific Supplies, Veterans Administration, P. O. Box 76, Hines, Illinois 60141
Mr. Herman Fishman, Executive Secretary, Michigan State Board of Pharmacy, 1033 South Washington Avenue, Lansing, Michigan 48910

Representing General Interests

Mr. Steven M. Horvath, Director and Professor, Institute of Environmental Stress, University of California, Santa Barbara, California 93106
Mr. Benjamin Krinitz, Supervisory Chemist, Food and Drug Administration, U. S. Department of Health, Education, and Welfare, 850 Third Avenue, Brooklyn, New York 11232
Mr. Joseph M. Zito, Standards Division, U. S. Testing Company, Inc., 1415 Park Avenue, Hoboken, New Jersey 07030
Mr. W. C. Tancig, Chemical Division, Consumers Union, 256 Washington Street, Mt. Vernon, New York 10550

10. ACCEPTORS

The producers, distributors, users, and others listed below have individually indicated in writing their acceptance of this Voluntary Product Standard prior to its publication. The acceptors

have indicated their intention to use this Standard as far as practicable but reserve the right to depart from it when necessary. The list is published to show the extent of recorded public support for this Standard.

ASSOCIATIONS
(General Support)

American Nurses' Association, New York, New York
National Association of Chain Drug Stores, Inc., Arlington, Virginia
National Association of Retail Druggists, The, Chicago, Illinois

PRODUCERS

Ballo Thermometers, Division of Chesebrough-Pond's, Inc., Leesburg, Florida
Becton, Dickinson and Company, Rutherford, New Jersey
Chase Instruments Corporation, Lindenhurst, New York
Chesebrough-Pond's Inc., Clinton, Connecticut
Dittmar Thermometer Corporation, Bellerose, New York
Eisele and Company, Inc., Nashville, Tennessee
Fairview Specialty Company, Brooklyn, New York
Fulton Instrument Company, Fulton, New York
Kaye Thermometer Corporation, Brooklyn, New York
Kessling, E., Thermometer Company, Inc., Brooklyn, New York
Ropper Manufacturing Company, Inc., Long Island City, New York
Stayne Medical Inc., East Rutherford, New Jersey

DISTRIBUTORS

Anderson Surgical Supply Company, Tampa, Florida
Bellevue Surgical Supply Company, Inc., Reading, Pennsylvania
Carolina Surgical Supply Company, Raleigh, North Carolina
Haag Drug Company, Inc., Indianapolis, Indiana
Hospital Purchasing Service of Pennsylvania, Philadelphia, Pennsylvania
Katz Drug Company, Kansas City, Missouri
Kay Surgical, Inc., Memphis, Tennessee
Midwest Surgical & Hospital Supply Company, Chicago, Illinois
NRTA-AARP Pharmacy, Washington, D.C.
Osco Drug, Inc., Franklin Park, Illinois
Taylor Instrument Companies, Arden, North Carolina

USERS

Allentown Hospital Association, The, Allentown, Pennsylvania
Ashland State General Hospital, Ashland, Pennsylvania
Beloit Memorial Hospital, Inc., Beloit, Wisconsin
Berea Hospital, Inc., Berea, Kentucky
Beth Israel Hospital, Boston, Massachusetts
Bethesda Hospitals, Cincinnati, Ohio
Blodgett Memorial Hospital, Grand Rapids, Michigan
Boston University Hospital, Boston, Massachusetts
Braddock General Hospital, Braddock, Pennsylvania
Bryn Mawr Hospital, The, Bryn Mawr, Pennsylvania
Buffalo General Hospital, The, Buffalo, New York
California, University of, Santa Barbara, California
Central Maine General Hospital, Lewiston, Maine
Central State Hospital, Petersburg, Virginia
Chicago Wesley Memorial Hospital, Chicago, Illinois
Children Hospital, St. Paul, Minnesota
Clearfield Hospital, Clearfield, Pennsylvania
Cleveland Clinic, Cleveland, Ohio
Colorado, University of, Medical Center, Denver, Colorado
Community Hospital, Kane, Pennsylvania
Community Medical Center, Scranton, Pennsylvania
Connecticut, University of, Hospital, Hartford, Connecticut
Cooley Dickinson Hospital, The, Northampton, Massachusetts