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

PRODUCT STANDARD PS28-70

GLASS STOPCOCKS WITH POLYTETRAFLUOROETHYLENE (PTFE) PLUGS

Product Standard PS28-70, Glass Stopcocks with Polytetrafluoroethylene (PTFE) Plugs, was withdrawn by the U.S. Department of Commerce in 1982.

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The following standard was used to replace PS28-70: ASTM E911-82, Standard Specification for Glass Stopcocks with Polytetrafluoroethylene (PTFE) Plugs.

This standard is under the jurisdiction of ASTM Technical Committee E41 on Laboratory Apparatus and under the direct responsibility of Subcommittee E41.01 on Apparatus.

For assistance and additional information on related standards, committee/subcommittee sources and/or copies, please contact:

American Society for Testing and Materials (ASTM)
100 Barr Harbor Drive
West Conshohocken, Pennsylvania 19428-2959, USA
Telephone: (610) 832-9500/-9585
Fax: (610) 832-9555; Website: http://www.astm.org

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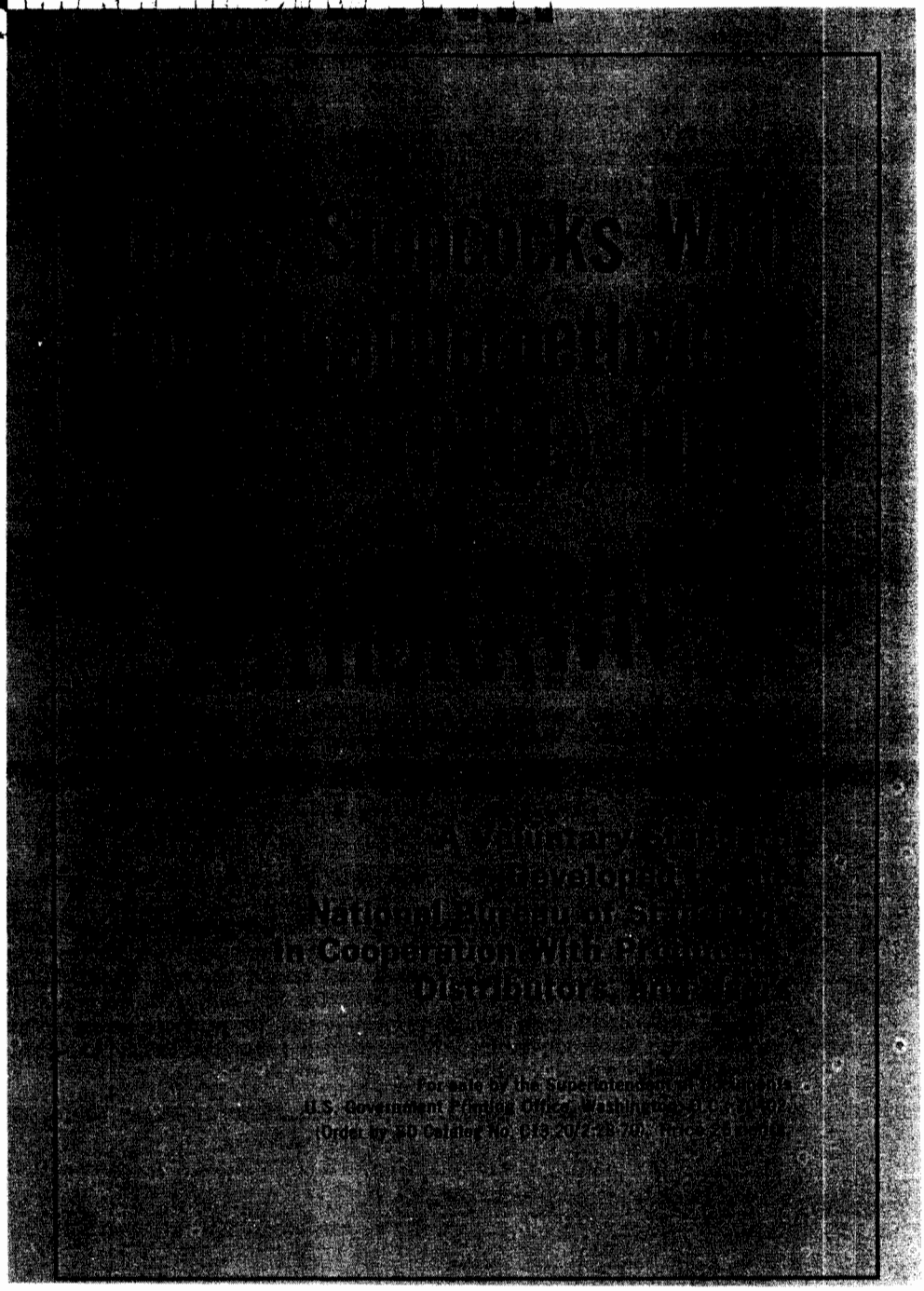
A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

NBS Voluntary Product Standard

PS 28-70

WITHDRAWN



U.S. DEPARTMENT OF COMMERCE

National Bureau of Standards

VOLUNTARY PRODUCT STANDARDS

Voluntary Product Standards are standards developed under procedures established by the Department of Commerce (15 CFR Part 10, as amended). 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 instrumentalities 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.

Nat. Bur. Stand. (U.S.), Prod. Stand. 28-70, 10 Pages (Sept. 1970)
CODEN: XNPSA

Voluntary Product Standard PS 28-70

Glass Stopcocks with Polytetrafluoroethylene (PTFE) Plugs

Effective May 1, 1970 (See section 6.)

(This voluntary standard, initiated by the Standing Committee for CS 21-58, *Interchangeable Taper-Ground Joints, Stopcocks, Stoppers, and Spherical-Ground Joints*, has been developed under the *Procedures for the Development of Voluntary Product Standards*, published by the Department of Commerce. See Section 7, *History of Project*, for further information.)

1. PURPOSE

The purpose of this Product Standard is to establish nationally recognized standard dimensions and performance criteria for glass stopcocks with PTFE plugs. General adoption of this Standard throughout the industry will provide for the interchangeability of components for these stopcocks of the same type and size.

2. SCOPE AND CLASSIFICATION

2.1. Scope—This Product Standard covers the design, dimensions, tolerances, and performance criteria for glass stopcocks with PTFE plugs. Also included are methods of marking and labeling to indicate compliance with this Standard. This Product Standard does not cover glass stopcocks with glass plugs,[1] nor glass stopcocks intended for use in high vacuum work.

2.2. Classification—Glass stopcocks covered by this Standard are classified by type as follows:

(1) Single straight-bore
(2) Single oblique-bore
(3) Double oblique-bore
(4) T-bore
(5) 120°-bore

3. REQUIREMENTS

3.1. General—Products represented as complying with this Voluntary Product Standard shall meet all of the requirements specified herein.

3.2. Design—The stopcocks shall consist of a glass shell and a plug made of polytetrafluoroethylene resin. The polytetrafluoroethylene material used in the manufacture of the plugs shall meet the requirements in the American Society for Testing and Materials (ASTM) Designation D 1457-66, *Standard Specification for TFE-Fluorocarbon Resin Molding and Extrusion Materials*,[2] for Types I and IV, extrusion and molding grade resins. The plug assembly shall include a means for seating the plug in the shell with sufficient

[1] Glass stopcocks with glass plugs are covered by Commercial Standard CS 21-58, *Interchangeable Taper-Ground Joints, Stopcocks, Stoppers and Spherical-Ground Joints.* Copies may be obtained from the Clearinghouse for Federal Scientific and Technical Information, 5285 Port Royal Road, Springfield, Virginia 22151, for $3 each.

[2] Later issues of the ASTM publications specified in this Product Standard may be used providing the requirements are applicable and consistent with the issues designated. Copies of ASTM publications may be obtained from the American Society for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103.

pressure or tension to effect a satisfactory seal, yet permit ease of turning. The mating surfaces of the glass shell and the plug shall have a taper of 2±0.006 mm per centimeter of axial length (1 to 5 taper).

3.3. Dimensions—

3.3.1. Single straight-bore, single oblique-bore, and double oblique-bore—The dimensions and tolerances of these three types of stopcocks shall conform to the requirements of tables 1, 2, and 3 respectively, when measured in accordance with 4.2.

3.3.2. T-bore and 120°-bore—The dimensions and tolerances for 1- and 2-mm T-bore stopcocks and 1- and 2-mm 120°-bore stopcocks shall be the same as for the 4-mm single straight-bore stopcocks (see table 1). The dimensions and tolerances for 4-mm T-bore stopcocks and 4-mm 120°-bore stopcocks shall be the same as for the 6-mm single straight-bore stopcock (see table 1).

3.4. Performance criteria—The stopcocks shall be evaluated for performance in accordance with 4.3. The 1-, 2-, 3-, and 4-mm straight-bore stopcocks shall be considered acceptable if the manometer reading indicates a pressure increase of not more than 30 torr (30-mm mercury), after 60 seconds with downward force applied by a 500-gram weight. All other stopcocks will be considered acceptable, if the manometer reading indicates a pressure increase of not more than 30 torr, after 60 seconds with downward force applied by a 1500-gram weight.

3.5. Marking—The stopcocks shall be marked with the size designation and the trademark of the manufacturer or distributor. The marking of the stopcock may be on the shell or adjacent parts.

TABLE 1.—*Dimensions of single straight-bore stopcocks*

Stopcock designation and bore of hole in plug	Diameter of plug at centerline of bore	Length of shell
B	D	E
mm	*mm* *mm*	*mm* *mm*
1	11 ±0.06	25±0.5
2	11 ± .06	25± .5
3	15.2± .10	30± .5
4	15.2± .10	30± .5
6	16 ± .20	35± .5

NOTE: The diagrams shown below are for the purpose of illustration only.

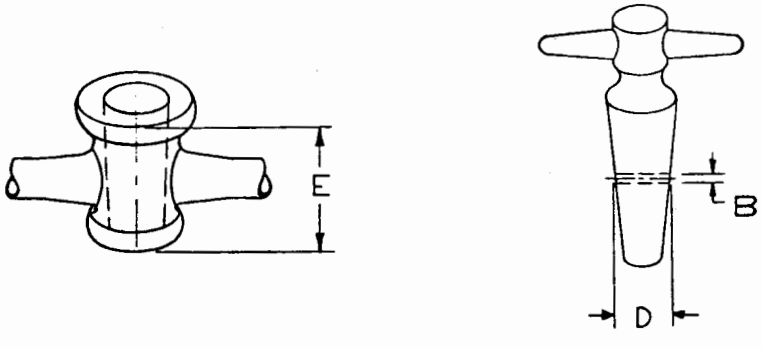


TABLE 2.—*Dimensions of single oblique-bore stopcocks*

Stopcock designation and bore of hole in plug	Diameter of plug at centerline of hole near large end	Length of shell	Axial distance from large end of shell to hole at D	Axial distance between bore holes
B	D	E	N	P
mm	*mm* *mm*	*mm* *mm*	*mm* *mm*	*mm* *mm*
2	15.9±0.20	60±0.5	11.5±0.5	8±0.5

NOTE: The diagrams shown below are for the purpose of illustration only.

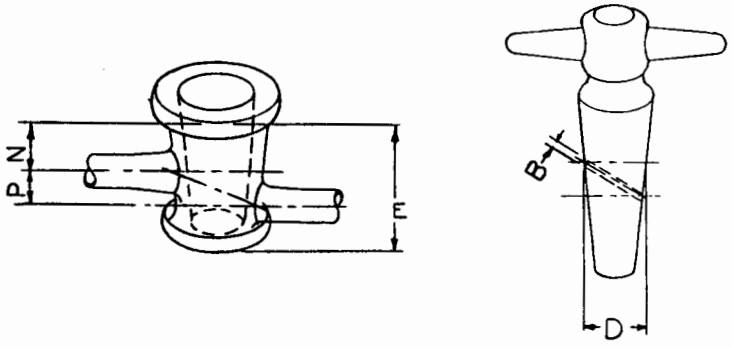
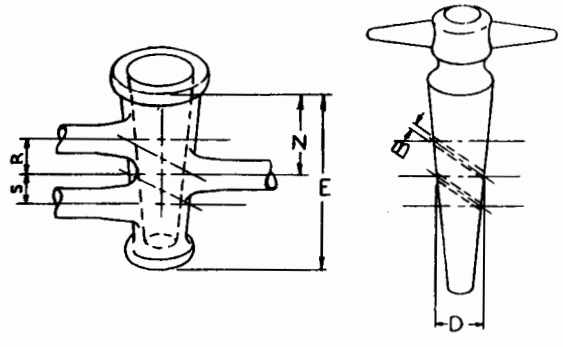


TABLE 3.—*Dimensions of double oblique-bore stopcocks*

Stopcock designation and bore of hole in plug	Diameter of plug at centerline of openings at center of plug	Length of shell	Axial distance from large end of shell to openings at D	Axial distance from openings at center to opening nearest large end	Axial distance from openings at center to opening nearest small end
B	D	E	N	R	S
mm	*mm* *mm*	*mm* *mm*	*mm* *mm*	*mm* *mm*	*mm* *mm*
1	12.9±0.06	44±0.5	22±0.5	9.4±0.5	8.1±0.5
2	12.9± .06	44± .5	22± .5	9.4± .5	8.1± .5
3	14.4± .10	44± .5	22± .5	10.4± .5	9.0± .5
4	14.4± .10	44± .5	22± .5	10.4± .5	9.0± .5

NOTE: The diagrams shown below are for the purpose of illustration only.



4. INSPECTION AND TEST PROCEDURES

4.1. General—The inspection and test procedures contained in this section are to be used to determine the conformance of products 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 have been met. Additional sampling and testing of the product, as may be agreed upon between purchaser and seller, is not precluded by this section.

4.2. Dimensions—The dimensions shall be determined in accordance with Method B of ASTM Designation D 374-57T, *Tentative Methods of Test for Thickness of Solid Electrical Insulation*,[3] except that micrometer calipers graduated to 0.01 mm shall be used.

4.3. Performance test—

4.3.1. Apparatus—The necessary test apparatus is illustrated schematically in figure 1. The leakage rate of air through the closed stopcock, T, under test shall be measured with the manometer, M. Stopcock, T, shall be properly supported with its plug vertical and the larger diameter on top. Any mechanism providing tension to the plug shall be removed. Weights, W, shall be suspended from the plug to apply a downward force for properly seating the plug in the barrel.

4.3.2. Procedure—

a. Check the apparatus setup, figure 1, for any leakage under the test conditions before any stopcocks, T, are tested.
b. Clean all surfaces of plug and shell with lint-free tissue or rinse with acetone.
c. Firmly seat plug into shell by rotating plug. Remove plug and repeat cleaning of both surfaces.
d. Attach stopcock, T, to rubber tubing, R, and secure connection.
e. Mount stopcock, T, horizontally so that the plug handle will be on top.
f. Gently reseat plug into shell in closed position without tension or pressure applied.
g. Suspend weight, W, under the tested plug in such a manner that the gravitational force is applied uniformly.
h. Turn stopcock, A, to connect source of vacuum and bulb, B; then evacuate to zero millimeter reading on scale, S, of closed-end manometer, M. Tap manometer gently before reading.
i. Turn stopcock, A, *clockwise* to connect stopcock, T, to vacuum, thus evacuating stem to test stopcock.
j. Turn stopcock, A, *clockwise* to connect stopcock, T, to bulb, B.
k. Time for 60 seconds and then turn stopcock, A, *counter-clockwise* to isolate manometer from stopcock, T, and vacuum source.
l. Tap manometer, M, gently, then measure and record pressure change (millimeters of mercury) of scale, S.

[3] See footnote 2, page 1.

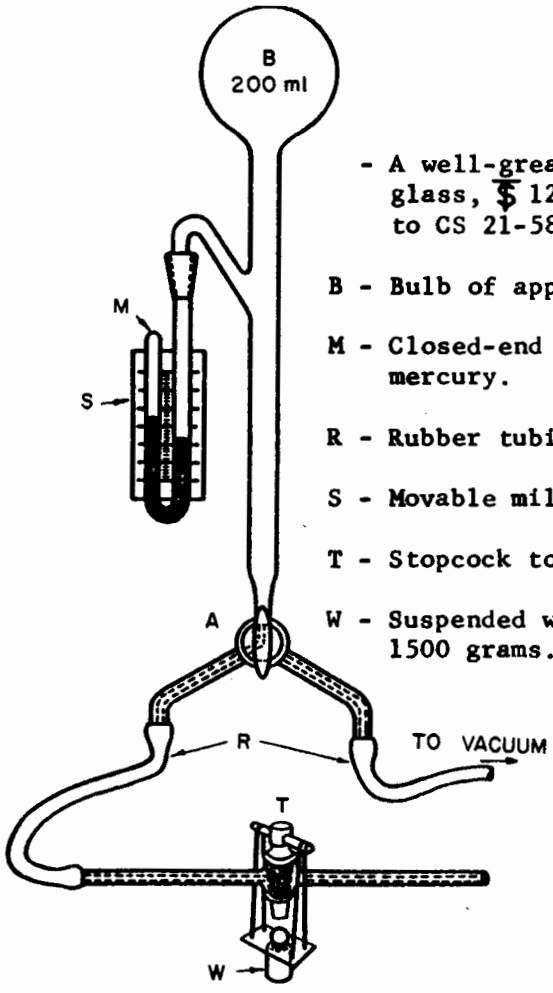


FIGURE 1. *Schematic drawing of test apparatus for performance evaluation.*

5. 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 stopcock with polytetrafluoroethylene (PTFE) plug conforms to all of the requirements established in Product Standard PS 28-70, 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 28-70, (name and address of producer or distributor).

6. 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 Product Standard may not actually occur until some time after its effective date. Products shall not be represented as conforming to this Product Standard until such time as all requirements established in the Standard are met. The effective date of this Standard is May 1, 1970.

7. HISTORY OF PROJECT

In December of 1967, the chairman of the Standing Committee for CS 21-58, *Interchangeable Taper-Ground Joints, Stopcocks, Stoppers, and Spherical-Ground Joints*, submitted to the Department of Commerce a draft of a proposed Standard for glass stopcocks with polytetrafluoroethylene (PTFE) plugs and a request that it be processed according to the *Procedures for the Development of Voluntary Product Standards*. A Standard for this product was needed by the industry to establish nationally recognized dimensions and performance criteria which would provide for the interchangeability of components for stopcocks of the same type and size.

The proposed Standard was submitted to a Standard Review Committee composed of manufacturers, distributors, and users of the product, and was approved unanimously. Based on the recommendation of the Standard Review Committee, the Standard was then circulated to all known manufacturers, and to a representative list of distributors and users of the product to determine its acceptability. The response to this circulation indicated a concensus of acceptability as defined in the *Procedures for the Development of Voluntary Product Standards.*

On April 14, 1970, the Standard designated PS 28-70, *Glass Stopcocks with Polytetrafluoroethylene (PTFE) Plugs*, was approved for publication by the National Bureau of Standards to be effective May 1, 1970.

Technical Standards Coordinator:

Charles B. Phucas, Office of Engineering Standards Services
National Bureau of Standards, Washington, D. C. 20234

8. 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

Paul Luertzing (Chairman), Lurex Manufacturing Company, Northwest Boulevard, Vineland, New Jersey 08360

C. M. DeWoody, Ace Glass, Inc., Vineland, New Jersey 08360

Wilton A. Hawkins, Chemplast Inc., 150 Dey Road, Wayne, New Jersey 08360

John W. Steel, Arthur H. Thomas Company, Vine Street at Third, Philadelphia, Pennsylvania 19105

Representing Distributors

William H. Geyer, Jr., Scientific Glass Apparatus Company, Inc., 735 Broad Street, Bloomfield, New Jersey 07003

Elmer L. Jolley, Supervisor-Product Engineering, Corning Glass, Corning, New York 14830

Duane E. Ramm, Kimble Products, Owens-Illinois, Inc., P.O. Box 230, Vineland, New Jersey 08360

John Roushey, Fisher and Porter Company, Laboratory Crest Scientific Division, 523 Warminster Road, Warminster, Pennsylvania 18974

Representing Users

John A. Burke, Jr., Chairman, Chemistry Department, Trinity University, 715 Stadium Drive, San Antonio, Texas 78212

Robert E. Dininny, Department of Chemistry, Albion College, Albion, Michigan 49224

Charles Guyton, Hazleton Laboratories, Inc., P.O. Box 30, Falls Church, Virginia 22046

Alex Viau, Chief Chemist, Twining Labs, Inc., 2527 Fresno Street, Fresno, California 93716

General Interest

John T. Pickett, General Quality Control Specialist, Marketing Division, Medical-Dental-Scientific Supplies, Veterans Administration Marketing Center, P.O. Box 76, Hines, Illinois 60141

9. ACCEPTORS

The manufacturers, 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.

PRODUCERS

Bellacour Company, The, New York, New York
Bellco Glass, Inc., Vineland, New Jersey
Chatas Glass Company, Vineland, New Jersey
Chemglass, Inc., Newfield, New Jersey
Chemplast, Inc., Wayne, New Jersey
Corning Glass Work, Corning, New York
Emerson Plastics Corporation, Bronx, New York
Fischer & Porter Company, Warminster, Pennsylvania
Houston Glass Fabricating Company, Houston, Texas
Kensington Scientific Corporation, Emeryville, California
Kontes Glass Company, Vineland, New Jersey
Lab Glass, Inc., Vineland, New Jersey
Lurex Manufacturing Company, Vineland, New Jersey
Owens-Illinois, Inc., Vineland, New Jersey
Scientific Glass Apparatus Company, Inc., Bloomfield, New Jersey
Scientific Glass Blowing Company, Inc. Houston, Texas
Stollenmaier, H., Company, Caldwell, New Jersey
Tri-Point Industries, Inc., Commack, New York
Wheaton Glass Company, Millville, New Jersey

DISTRIBUTORS

Fisher Scientific Company, Pittsburgh, Pennsylvania
Hach Chemical Company, Ames, Iowa
Kaufman Glass Company, Wilmington, Delaware
Polytechnical Products Company, Haddonfield, New Jersey
Thomas, Arthur H., Company, Philadelphia, Pennsylvania

USERS

Albion College, Department of Chemistry, Albion, Michigan
American Standard, Inc., Falls Church, Virginia
Arizona State University, Chemistry Department, Tempe, Arizona
Boston University, Department of Chemistry, Boston, Massachusetts
CALBIOCHEM, Los Angeles, California
Canada Agriculture, London, Ontario, Canada
Colburn Laboratories, Inc., Chicago, Illinois
Florida Atlantic University, Department of Chemistry, Boca Raton, Florida
Gulf Research and Development Company, Pittsburgh, Pennsylvania
Iowa Wesleyan College, Chemistry Department, Mt. Pleasant, Iowa
Long Island University, Chemistry Department, Brooklyn, New York
Lucius Pitkin, Inc., New York, New York
Metaloglass, Inc., Boston, Massachusetts
Miami University, Department of Chemistry, Oxford, Ohio
Millikin University, Department of Chemistry, Decatur, Illinois
Nester, L. G., Comany, Millville, New Jersey
New York Sugar Trade Laboratory, Inc., New York, New York
Oklahoma State University, Chemistry Department, Stillwater, Oklahoma
Pope Scientific, Inc., Menomonee Falls, Wisconsin
PPG Industries, Inc., Barberton, Ohio
Shilstone Testing Laboratory, Inc., New Orleans, Louisiana
South Carolina State College, Department of Natural Sciences, Orangeburg, South Carolina
Syracuse University, Chemistry Department, Syracuse, New York
Tennessee Technological University, Department of Analytical Chemistry, Cookeville, Tennessee
3M Company, St. Paul, Minnesota
Trinity University, Chemistry Department, San Antonio, Texas
Union University, Department of Chemistry, Jackson, Tennessee
University of Akron, Department of Chemistry, Akron, Ohio
University of Alaska, Department of Chemistry and Chemical Engineering, College, Alaska
University of Arizona, Chemistry Department, Tucson, Arizona
University of California, College of Chemistry, Berkeley, California
University of Illinois, Chemistry Department, Urbana, Illinois
University of North Carolina, Chemistry Department, Chapel Hill, North Carolina
University of South Dakota, Department of Chemistry, Vermillion, South Dakota
University of South Florida, Department of Chemistry, Tampa, Florida
University of Tennessee at Chattanooga, Chemistry Department, Chattanooga, Tennessee
University of Texas at Austin, Department of Chemistry, Austin, Texas
Valparaiso University, Chemistry Department, Valparaiso, Indiana
Western Maryland College, Chemistry Department, Westminster, Maryland
Western Scientific Apparatus Company, Inc., Berkeley, California
Winthrop College, Department of Chemistry, Rock Hill, South Carolina
WRAIR, WRAMC, Glassworking Department, Washington, D.C.

GENERAL INTEREST

American Hospital Supply Corporation, Evanston, Illinois
Atlantic Optical Moulding Company, Dudley, Massachusetts
E. I. Dupont de Nemours Company, Wilmington, Delaware
Froehling & Robertson, Inc., Richmond, Virginia
ITE-Imperial Corporation, Chicago, Illinois
Landay Scientific Glass Laboratory, Inc., Boulder, Colorado
U.S. Testing Company, Inc., Hoboken, New Jersey

FEDERAL GOVERNMENT

Health, Education, and Welfare, Department of, Division of Procurement and Material Management, Washington, D.C.

STATE AND LOCAL GOVERNMENT

District of Columbia Government, General Services, Bureau of Procurement, Washington, D.C.
Hawaii, State of, Department of Accounting and General Services, Honolulu, Hawaii
Pennsylvania, Commonwealth of, Department of Property and Supplies, Harrisburg, Pennsylvania