

PRODUCT
STANDARD
PS 0-67

**Editorial Format
for
PRODUCT STANDARDS**



DEVELOPED COOPERATIVELY WITH
NATIONAL BUREAU OF STANDARDS
U.S. DEPARTMENT OF COMMERCE

PRODUCT STANDARDS

Product Standards are published voluntary standards that establish (1) dimensional requirements for standard sizes and types of various products, (2) technical requirements for the product, and (3) methods of testing, grading, and marking these products. The objective is to define requirements for these products in accordance with the principal demands of the trade. *Product Standards* are published by the National Bureau of Standards of the U. S. Department of Commerce.

Development of a PRODUCT STANDARD

The Bureau's Office of Engineering Standards Services works closely with business firms, trade organizations, testing laboratories, and other appropriate groups to develop such standards. (A group interested in developing a Product Standard may submit a written request to the Manager, Engineering Standards, National Bureau of Standards.) After determining that the desired standard would be technically feasible and in the public interest, a specific proposal is developed in consultation with interested trade groups and circulated for industry consideration and comment.

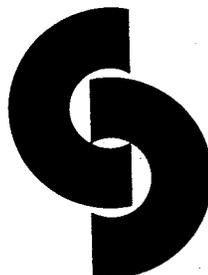
Subsequently, a Standard Review Committee is established to review the proposed standard for conformance with the Department of Commerce procedures. The committee includes qualified representatives of producers, distributors, and users or consumers of the product. When approved by the committee, copies of the recommended standard are distributed for consideration and acceptance. When the acceptances show general agreement by all segments of the industry, and when there is no substantive objection deemed valid by the National Bureau of Standards, the Bureau announces approval of the Product Standard and proceeds with its publication.

Use of a PRODUCT STANDARD

Product Standards are developed for the maximum use of industry by ensuring that producers, distributors, and users or consumers cooperate in the development of a voluntary Product Standard. The adoption and use of a Product Standard is *voluntary*. Product Standards are used most effectively in conjunction with legal instrumentalities such as building codes, purchase orders, and sales contracts. When a standard is made part of such a contract, compliance with the standard is enforceable by the buyer or the seller along with other provisions of the contract. There is *no* governmental regulation or control involved.

Purchasers may order products that comply with Product Standards and determine for themselves that their requirements are met. More often, manufacturers refer to the standards in sales catalogs, advertising, invoices, and labels on the product. Commercial inspection and testing programs are also employed for greater effectiveness together with grade labels, hallmarks and certificates. Such assurance of compliance promotes confidence and understanding between buyers and sellers. The hallmark recommended for identifying products complying with all the requirements of a Product Standard is illustrated below.

Complies With
**VOLUNTARY
INDUSTRY
PRODUCT
STANDARD**
PS - - 6



DEVELOPED COOPERATIVELY WITH
NATIONAL BUREAU OF STANDARDS
U. S. DEPARTMENT OF COMMERCE

Editorial Format for PRODUCT STANDARDS

Introduction

The National Bureau of Standards, U.S. Department of Commerce, assists industry groups and public agencies in the development of voluntary standards for various products. These standards are developed in the public interest under specific procedures which ensure participation and provide acceptance opportunities to all interested groups. The procedures were published in the December 10, 1965, *Federal Register* (Vol. 30, No. 238), and copies are available from the Product Standards Section of the Office of Engineering Standards Services.

Product Standards may establish (1) standard stock sizes, as well as lists of dimensions, varieties, and types of various products; (2) performance requirements, safety requirements, material specifications, and technical requirements for materials and construction of various products; and (3) methods of testing, rating, grading, certifying and labeling of these products. The objective is to describe the physical characteristics of common stock items and, whenever appropriate, to define quality levels for these products which will be generally acceptable to the industry and not contrary to the public interest. Uniform methods are established, when appropriate, for achieving and determining compliance through special test procedures.

Manufacturers may refer to the standards in sales catalogs, advertising, invoices, and labels on the product. Such use of labels provides an effective means for assuring the purchaser that specific products comply with a standard and thus, promotes confidence and understanding between buyers and sellers. The use of a "hallmark" is recommended for identifying products complying with all of the requirements of a Product Standard.

Product Standards are used effectively in conjunction with building codes, purchase orders, and sales contracts. When a standard is made part of such a contract, compliance with the standard is enforceable by the buyer or the seller along with other provisions of the contract. There is no Governmental regulation or control involved.

The format described herein constitutes a general guide for the use of proponent groups in preparing an initial draft of a standard, and by others engaged in *Product Standards* work. These editorial requirements *should not* be regarded as mandatory, but are generally recommended as standard form. Drafts of proposed standards *should* be submitted to the *Office of Engineering Standards Services, National Bureau of Standards, Washington, D.C. 20234*, in accordance with the established procedures.

The editorial format, as described herein, is divided into two parts: The first deals with the basic contents of the *Product Standard*, and the second provides detailed instructions for writing *Product Standards*.

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Editorial Format for PRODUCT STANDARDS

PART I. Contents of a PRODUCT STANDARD

SECTION 1. PURPOSE

1.1. The standard *shall* contain a brief introductory statement providing the *basic* reasons for establishing and developing the standard.

SECTION 2. SCOPE AND CLASSIFICATION

2.1. **Scope.**—The statement of the scope of the standard *shall* consist of a clear and concise abstract of its coverage. The scope should also contain a statement that the standard includes a provision for identifying and labeling the material or product conforming to the standard, as well as a glossary of technical and other appropriate terms.

2.2. **Classification.**—When appropriate, designation of classifications such as types, grades, classes, etc., *shall* be listed under this heading and *shall* be in accordance with accepted practice as defined below. When more than one type, grade, class, etc., is listed, each *shall* be briefly, but specifically defined.

2.2.1. **Classification definitions.**—For the purpose of preparing standards, definitions for size, type, class, grade, and composition are listed below:

Size.—Includes dimensions and capacities for the *standard* or *common* stock items as well as for the *special* items which are so recognized. Standards concerning only package sizes and labeling practices shall list such sizes in the requirements section rather than in this section.

Type.—Used when major differences exist in the design, shape, or style of similar products. Type is generally designated by roman numerals, thus: Type I, Type II, etc.

Class.—Refers to differences in mechanical or other characteristics of products which do not constitute a difference in quality or grade, but are for specific and equally important uses. Class is generally designated by arabic numerals, thus: Class 1, Class 2, etc.

Grade.—Implies differences in *quality* of a product and is generally designated in decreasing order by capital letters, thus: Grade A, Grade B, etc.

Other Classifications.—If the above terms do not serve accurately to classify the differences in the product, terms such as color, form, weight, power supply, temperature rating, etc., may be used.

SECTION 3. REQUIREMENTS

3.1. **General.**—The requirements sections *shall* include all essential sizes, performance criteria, safety requirements, material specifications, and product requirements applying to design, material, or construction of all products covered by the standard. This section *shall* also specify and describe, when appropriate, the requirements for quality and workmanship which the product *shall* meet to be in conformance with the standard.

The requirements *shall* be established whenever possible in terms of performance criteria rather than material specifications. The requirements should be so worded as to provide a definite basis for rejection in those cases where the quality and workmanship are such that they do not conform to the requirements.

A general statement should be made in the first paragraph to the effect that any product labeled or represented as complying with the standard *shall* meet *all* of the specific requirements as determined by the quality control, inspection, and testing procedures specified in the testing section. The requirements for the individual component parts of a complete unit should be covered separately. Direct cross-referencing to the test methods to be used for determining conformance, as described in Section 4, *shall* be made.

3.2. **Sizes.**—All dimensions, capacities, size designations, and volumes *shall* be specified in customary units and if the customary units are those of the English system, metric units shall be shown parenthetically, as appropriate. Tolerances or limits *shall* be designated in decimals or in fractions, as applicable, and may be accompanied by recognized gage number designations in parentheses. If a figure is included showing dimensions and tolerances, the text shall refer to the figure. Standards concerning package sizes *shall* provide a tabular listing of such sizes.

3.3. **Materials.**—The requirements for individual materials, parts, or components to be used in the product covered by the standard should be stated in this subsection; requirements of a general nature or of major importance should be stated first, followed by specific requirements for materials for the component parts. When a published specification for a material or a certain component part is applicable, it should be included by reference.

3.4. Design and construction.—The major functional characteristics *shall* be specified under this heading. Detailed design characteristics should be covered in individual paragraphs.

Specific points of construction *shall* be included under this heading, when applicable. Construction requirements should be related to the physical limitations imposed and to those stresses which the product is expected to withstand.

3.5. Specific properties.—When applicable, the required properties, including mechanical, chemical, or electrical, etc., of the finished product *shall* be specified under appropriate paragraph headings to include such properties as hardness, tensile strength, acidity, toxicity, resistivity, dielectric strength, etc.

3.6. Performance requirements.—Appropriate detailed performance characteristics of the finished product *shall* be included under headings specifying exactly what is expected of the product, equipment, materials, or service. These requirements will be established in a manner that will make them readily understood and correctly applied in determining compliance.

3.7. Workmanship.—Where applicable, reference to workmanship *shall* generally constitute the last paragraph of Section 3. This paragraph *shall* include the necessary requirements relative to the standards of workmanship such as uniformity and the lack of defects. This subsection is intended to indicate, as specifically as possible, the standards of quality and workmanship which the product *shall* meet. The requirements should be worded to provide a clear, reasonable, and logical basis for rejection in those cases where the quality and workmanship are such that they do not conform to the exact requirements.

3.8. Finish.—Finish requirements, when applicable, *shall* be specified under this heading for such properties as smoothness, freedom from roughness, freedom from excessive oxide scales, and the general appearance of the finished product. Protective coatings may be listed in this section. Where feasible, color and finish should be combined.

SECTION 4. INSPECTION AND TEST PROCEDURES

4.1. General.—Inspection procedures and test methods, when appropriate, *shall* be established to determine conformance with the requirements of the standard. Descriptions of the materials and equipment used in making tests on the product *shall* be included whenever necessary. This section may include procedures concerning inspection and tests, as applicable, but *shall not* contain provisions properly a part of other sections. Information may be included concerning conditioning, specific methods, and frequency of inspection.

4.1.1. Arrangement.—Requirements which are stated in Section 3 *shall* be supported by appropriate test provisions in this section and *shall* be arranged in the same order as the corresponding requirements.

4.1.2. Reference to related documents.—When another specification or related document regarding inspection and testing procedures forms a part of this section by reference, requirements for sampling, inspection, and testing *shall not* be repeated. Appropriate reference should be included to indicate the applicable methods required.

4.2. Inspection.—Provisions and instructions for inspection *shall* appear under this heading, including those for visual examinations for defects, finish, and dimensions.

4.3. Test procedures.—Test procedures, as appropriate, *shall* be included in this section, to which the items, material, or components are to be subjected in order to determine conformance with the requirements of the standard. Descriptions of the methods of testing and reporting *shall* be included as necessary to insure that they will be properly applied. Other information such as location, size, and number of test specimens, conditioning, and complete description of testing apparatus *shall* be included where appropriate.

4.4. Quality control practice.—Unless a specific control practice is agreed upon, this paragraph should be worded in general terms such as the following:

The producers shall keep such essential records and other information to document his claim that the requirements of this standard are met with a high degree of assurance. This requirement does not preclude additional sampling and testing that may be agreed upon between the parties concerned to verify the validity of the claim.

4.5. Independent certification.—The industry concerned may see fit to adopt a self-policing certification program whereby the manufacturer does not certify compliance with the standard, but contracts with a "qualified independent testing and inspection bureau or agency"¹ to carry out the necessary sampling, inspection, testing, and quality control and to affix or verify the applicable label or grade mark to each qualifying product. This type of program gives assurance to the consumer and distributor that the product has been technically examined by knowledgeable persons other than the producer, and found to comply with the standard.

SECTION 5. DEFINITIONS

5.1. Definitions *shall* be included in the standard whenever it is necessary to set forth specific meanings or interpretations for terms used within the standard. Definitions *shall* be clear and concise and *shall* be referenced within the standard wherever necessary to prevent confusion or to avoid misinterpretation. Nationally recognized definitions *shall* be used wherever possible in an

¹ A qualified inspection and testing bureau or agency is defined as one that (a) has the facilities and trained technical personnel to verify that the grading, measuring, construction, workmanship, and other characteristics of the products as determined by inspection, sampling, and testing comply with all applicable requirements specified herein; (b) has developed procedures to be followed by agency personnel in performance of the inspection and testing; (c) has no financial interest in or is not financially dependent upon any company manufacturing the product being inspected or tested or any portion thereof; and (d) is not owned, operated, or controlled in whole or in part by any such company.

effort to increase the degree of standardization concerning a particular product. Reference *shall* be made to such recognized definitions, if published and available, whenever appropriate.

SECTION 6. IDENTIFICATION

6.1. Labels and literature.—In order that purchasers may identify products complying with all requirements of the Product Standard, producers choosing to comply with the voluntary standard should include a statement in conjunction with their name and address on labels, invoices, sales literature, etc.

6.1.1. The following statement is suggested when sufficient space is available:

This (name of product—not trade name) complies with all of the requirements of Product Standard PS—
~~—~~, as developed cooperatively with the industry
~~and issued~~ ^{published} by the National Bureau of Standards,
under the Voluntary Product Standards Procedures
of the U.S. Department of Commerce.

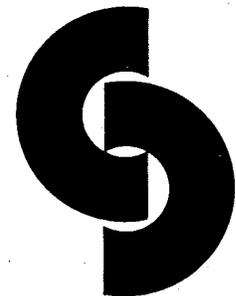
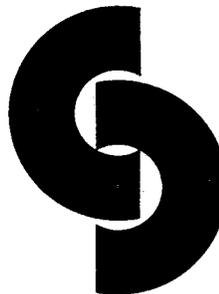
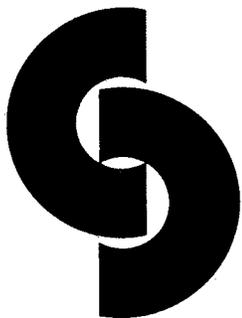
6.1.2. The following abbreviated statement is suggested when available space on labels is insufficient for the full statement:

Complies with PS — —, published by the National Bureau of Standards.

6.2. Hallmark.—Products may carry a hallmark to indicate compliance with a Product Standard. The “hallmark” to be used is shown in Figure 1. The manufacturers’ identification (including name and address where appropriate) must be provided on a product whenever the hallmark is used. It is suggested that the “hallmark” first be used with the accompanying language describing the significance of the mark. It is further suggested that the “hallmark” be used without such language only after the industry is completely familiar with the mark and its significance.

Complies With
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FIGURE 1

SECTION 7. HISTORY

7.1. The history section *shall* include such information as the name of the proponent group, the date of their request for the development of voluntary standard, as well as the pertinent steps and dates in the development procedure, and any other appropriate information including the effective date of the standard. In the case of revisions, the information relating to the development of the initial standard may be condensed and a statement added concerning the history of the revision.

SECTION 8. STANDING COMMITTEE

8.1. A Standing Committee will be appointed by the National Bureau of Standards to receive and consider proposals to revise or amend the standard in light of changing circumstances. The membership of the Standing Committee *shall* consist of producers, distributors, and users, whenever possible. The names, addresses, and affiliations of the members of the Standing Committee should be listed directly below the following introductory paragraph:

Standing Committee

The following individuals comprise the membership of the Standing Committee, whose function is to review and approve revisions proposed to keep this standard abreast of progress prior to circulation for acceptance. Comments concerning the standard, as well as suggestions for a revision, may be addressed to any member of the Committee or to the Office of Engineering Standards Services, National Bureau of Standards, which acts as the Secretary for the Committee.

SECTION 9. ACCEPTORS

9.1. The known acceptors of the standard prior to the publication may be alphabetically listed

in this section under the general headings of "General Support—Technical Societies," "Producers," and "Other Interests." When appropriate, distributors, users, and Government agencies (Federal, State, and Local) will be listed separately. In some instances, the list of acceptors will not be included in the published standard. In other instances, only producers and general supporting groups will be listed. The following paragraphs *shall* precede the list of acceptors:

Acceptors

The producers, distributors, users, and others listed below have individually indicated in writing their acceptance of this Product Standard prior to its publication. The acceptors have indicated their intention to utilize the standard as far as practicable. However, these producers realize that they have reserved the right to depart from it when necessary. Only those

products actually conforming to all requirements established by the Product Standard can be labeled or described as such. The list is published to show the extent of recorded public support for the standard and should not be construed as indicating that all products made by the acceptors actually comply with all requirements of the standard.

Products that meet all requirements of the standard may be identified as such by a certification statement and hallmark. Purchasers are encouraged to require such specific representation of compliance, which may be given by the manufacturer whether or not he is an acceptor.

APPENDIX

Whenever needed, supporting material such as explanatory and educational information, details of testing equipment, design of quality controls, and installation instructions may be included in the appendix of a standard.

PART II. Instructions for Writing PRODUCT STANDARDS

The following detailed instructions will serve as a supplement to those given in Part 1, "Contents of a PRODUCT STANDARD" and are recommended as editorial guidelines to be utilized in preparing such standards.

SECTION 1. CONTENT

The standard shall be written in a clear, accurate, simple, and brief form. However, there shall be adequate coverage of the necessary requirements and the methods to be used in determining that these requirements have been met. Superfluous explanatory material and complicated technical statements which will not directly serve a useful purpose shall be avoided. The subject matter shall be kept within the scope of the sections in order that similar requirements or information will appear in the same sections of all standards. The content of the various sections shall be restricted to that applicable to each section as described in Part I. In addition to these sections, the standard may include special sections for additional information which is deemed to be necessary.

SECTION 2. STYLE

The standard shall be reduced to its technical essence and minimum form and at the same time, shall be complete in the stipulation of all requirements. Such stipulation may be made either directly or be referenced to other documents. The text shall be composed of clear and simple language, and shall be free of vague terms which may be subject to differences in interpretation. The *U.S. Government Printing Office Style Manual* shall be used as a guide to capitalization, spelling, punctuation, abbreviations, syllabication, etc. When information is not covered by the *Style Manual*, the *National Bureau of Standards Publications and Reports Manual* and *Webster's New International Unabridged Dictionary* shall be used.

SECTION 3. REFERENCE TO OTHER DOCUMENTS

When requirements are established by reference to other nationally recognized and conveniently available specifications, standards, publications, or drawings, the standard shall not repeat the information covered by the documents to which reference is made. The following recommendations will provide guidance for referencing other documents.

(1) Referencing of specifications and standards is recognized as necessary to eliminate repetitive inclusion of identical requirements in numerous specifications; however, when feasible, the standard should be complete and essentially self-contained.

(2) A standard shall not contain anything in conflict with the provisions of the referenced specifications unless it is desirable to make special exception to such provisions, in which case, the specific requirement to which exception is made shall be clearly stipulated.

(3) It is intended that other documents be made a part of a Product Standard when the items, materials, or services in the referenced documents are required in the quality and performance which those documents are specifically designed to produce.

SECTION 4. PHRASING

There are certain phrases frequently used in standards to indicate conformance with established requirements. Requirements established by reference should be written thus: ". . . produced in accordance with the specifications (or figure) stated in . . ." or ". . . the material shall be as specified in the specification. . . ."

When it is necessary to use the phrase "unless otherwise specified" to indicate an alternate course of action, the phrase should always come at the beginning of the sentence, and, if possible, at the beginning of the paragraph. This phrase should be limited in its application and used sparingly. When reference is made to a requirement in the standard that is rather obvious or not difficult to locate, the simple phrase ". . . as specified herein" is sufficient and should be used. The phrases ". . . to determine compliance with . . ." or "to determine conformance to . . ." should be used in place of the phrase ". . . to determine compliance to . . ." The same wording should be used throughout.

In stating positive limitations, the phrasing shall be stated thus: "The diameter shall be not greater than . . ." The emphatic form of the verb *shall* shall be used throughout the standard. For instance, in the requirements section, a statement shall be made establishing a requirement emphatically as follows: "The indicator shall be designed to indicate . . ." In the test section, a requirement shall be stated as follows: "The indicator shall be

turned to zero and 220 volts alternating current applied."

For specific test procedures, the imperative form may be used provided the entire method is preceded by "The following tests shall be performed" or related wording, thus: "Turn the indicator to zero and apply 220 volts alternating current." Capitalize the words "Specification," "Figure," and "Bulletin," only when they are used immediately preceding the number of a document, thus: ". . . specified in the Federal Specification G-D-221", but "This specification supersedes . . .".

SECTION 5. PARAGRAPH STRUCTURE

5.1. Heading.—Each paragraph and subparagraph heading should be given a subject heading. The first letter of the first word in the paragraph headings should be capitalized. Similar paragraph headings in any one section shall be avoided.

5.2. Underlining.—All of the requirements are important in obtaining the desired product; therefore, it should not be necessary to underline any portion of the paragraph or capitalize phrases or words for the sake of emphasis.

5.3. Cross-referencing.—When cross-references are made to other paragraphs or subparagraphs within the same standard, the reference will be made to the number of the paragraph. Extreme care should be exercised in making such references, in order to maintain complete accuracy. (Reference to paragraph numbers of other specifications shall be made in conjunction with the symbol and/or number identifying that standard.)

5.4. Paragraph numbering.—Each general heading or separate requirement, as the case may be, shall be covered by a separate paragraph and shall be broken down into their different requirements by subparagraphs, as applicable. Sections, paragraphs and subparagraphs shall be numbered consecutively.

Example

Section	3.
First paragraph	3.1.
First subparagraph	3.1.1.
First sub-subparagraph	3.1.1.1.

When cross-references are made to paragraphs, subparagraphs, etc., the reference shall simply refer to numbers such as 3.1. or 3.1.1., etc. In no case shall more than four numbers be used in subdividing the text.

SECTION 6. ABBREVIATIONS AND SYMBOLS

6.1. Abbreviations.—The use of abbreviations shall be restricted to those in common usage and not subject to possible misunderstanding; wherever used, the meaning should be clear. The first time the abbreviation is used, it should be preceded by the word spelled out; for example, "The noise level shall not exceed 20 decibels (db)." When abbreviations are used, their use throughout the standard shall be consistent; the same word shall not be abbreviated in one place in the context and the same word spelled out in other places except that

it is permissible to use abbreviations in tables and figures where they will produce a genuine saving in space, such as the saving of a line or column. In general, terms which seldom occur shall not be abbreviated. Since persons who use specifications are not necessarily technically trained, abbreviations may, at times, be misinterpreted.

6.2. Symbols.—The use of symbols should generally be avoided. The use of (') or (") for feet or inches is not recommended. The percentage symbol (%) shall not be used in the text, but may be used in tables when space is limited. (Any symbol formed by a single character should be avoided, where practicable, since an error destroys the intended meaning.) Do not use "x" when expressing size such as "2 x 4 x 6"; instead, use the word "by"; e.g., "2 by 4 by 6 inches."

SECTION 7. USE OF THE WORDS "SHALL", "WILL", "SHOULD", AND "MAY"

In stating the requirements of the specification, use the word "shall." Do not use the words "will," "should," or "may," for this purpose. Use the words "will," "should," and "may," as applicable, wherever it is necessary to express non-mandatory provisions.

SECTION 8. FOOTNOTES

Footnote references in the text shall be used sparingly. Consecutive arabic numerals, beginning with "1" shall be used for footnote references in the text of the standard. In tables, footnote references shall be numbered separately for each table in accordance with the *U.S. Government Printing Office Style Manual*. However, if numerals lead to ambiguity (for example, in connection with a chemical formula), superior letters, asterisks, and other symbols may be utilized. Footnotes to the text shall be placed at the bottom of the page; footnotes to tables, below each table.

SECTION 9. FIGURES

The word "figure" is used to identify illustrations and graphs which form a part of the requirements of the standard. In general, figures shall be placed in the body of the standard immediately following the paragraph or page where the first reference appears. The word "figure" shall precede the number. Figures shall be used wherever practicable to describe the item covered by the standard more clearly and accurately than can be stated in the text. Arabic numerals such as "Figure 4" shall be used in designating figures rather than roman numerals. All figures should be numbered consecutively in the order in which they are initially referenced in the standard and whenever practicable should be titled. All items shown in the figure should be clearly identified.

SECTION 10. TABLES

Tables should be used wherever such presentation will eliminate repetition or show relationships

clearly. All tables should be numbered consecutively in the order in which they are initially referenced in the standard and, whenever practicable, should be titled. Arabic numerals shall be used in designating tables; thus, "Table 6," not "Table VI." Tables should be placed in the body of the standard immediately following the paragraph where the first reference appears. If space does not permit this, they shall be placed at the beginning of the succeeding page, or, if extensive, on a separate page.

SECTION 11. PROPRIETARY ITEMS

Trade names, copyrighted names, or proprietary names applying exclusively to the product of one manufacturer should not be used. If its use is un-

avoidable, the name shall be followed by "or equal," with a statement to the effect that the use of such names is solely for the purpose of description and that other articles equal in performance will be acceptable.

SECTION 12. DEFINITIONS OF TERMS USED IN STANDARDS

The necessity for a definition can be avoided in many cases if requirements are properly stated. However, in those cases where the proper interpretation of a standard may be dependent upon agreement as to definitions of terms which are to be accepted for a standard, such definitions of terms should be included.

NBS TECHNICAL PUBLICATIONS

Periodicals

JOURNAL OF RESEARCH reports National Bureau of Standards research and development in physics, mathematics, chemistry, and engineering. Comprehensive scientific papers give complete details of the work, including laboratory data, experimental procedures, and theoretical and mathematical analyses. Illustrated with photographs, drawings, and charts. *Published in three sections, available separately:*

• Physics and Chemistry

Papers of interest primarily to scientists working in these fields. This section covers a broad range of physical and chemical research, with major emphasis on standards of physical measurement, fundamental constants, and properties of matter. Issued six times a year. Annual subscription: Domestic, \$5.00; foreign, \$6.00*.

• Mathematical Sciences

Studies and compilations designed mainly for the mathematician and theoretical physicist. Topics in mathematical statistics, theory of experiment design, numerical analysis, theoretical physics and chemistry, logical design and programming of computers and computer systems. Short numerical tables. Issued quarterly. Annual subscription: Domestic, \$2.25; foreign, \$2.75*.

• Engineering and Instrumentation

Reporting results of interest chiefly to the engineer and the applied scientist. This section includes many of the new developments in instrumentation resulting from the Bureau's work in physical measurement, data processing, and development of test methods. It also covers some of the work in acoustics, applied mechanics, building research, and cryogenic engineering. Issued quarterly. Annual subscription: Domestic, \$2.75; foreign, \$3.50*.

TECHNICAL NEWS BULLETIN

The best single source of information concerning the Bureau's research, developmental, cooperative and publication activities, this monthly publication is designed for the industry-oriented individual whose daily work involves intimate contact with science and technology—*for engineers, chemists, physicists, research managers, product-development managers, and company executives.* Annual subscription: Domestic, \$1.50; foreign, \$2.25*.

* Difference in price is due to extra cost of foreign mailing.

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