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**Product Standard PS59-73
Prefinished Hardboard Paneling**

Product Standard PS59-73, Prefinished Hardboard Paneling, was withdrawn by the U.S. Department of Commerce in 1982.

The following standard was used to replace PS59-73: ANSI/AHA Standard A135.5, Prefinished (PF) Hardboard Paneling.

For technical assistance and additional information on this standard and related standards (such as ANSI A135.4 - Basic Hardboard ; ANSI A135.6 - Hardboard Siding), contact:

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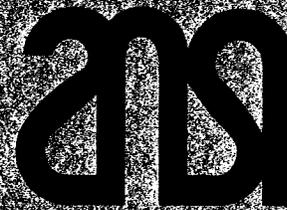
Voluntary Product Standard

PS 59-73

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**PREFINISHED
HARDBOARD PANELING**



American National
Standards Institute

American National Standard A 135.5-1973

A UNITED STATES
DEPARTMENT OF
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U.S.
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National
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of
Standards

UNITED STATES DEPARTMENT OF COMMERCE • Frederick B. Dent, *Secretary*

NATIONAL BUREAU OF STANDARDS • Richard W. Roberts, *Director*

Voluntary Product Standard PS 59-73

Prefinished Hardboard Paneling

Approved by the American National Standards Institute on
December 18, 1973, as American National Standard A135.5-1973

Abstract

This Voluntary Product Standard covers requirements and methods of test for the dimensions, squareness, edge straightness, and moisture content of prefinished hardboard paneling; for the physical properties of the hardboard substrate; and for the finish of the paneling. Methods of identifying products which conform to the requirements of the standard are included.

Key words: Hardboard paneling; paneling, hardboard; prefinished hardboard paneling.

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VOLUNTARY PRODUCT STANDARDS

Voluntary Product Standards are developed under procedures published by the Department of Commerce in Part 10, Title 15, of the Code of Federal Regulations. The purpose of the standards is to establish nationally recognized requirements for products, and to provide all concerned interests with a basis for common understanding of the characteristics of the products. The National Bureau of Standards administers the *Voluntary Product Standards* program as a supplement to the activities of the private sector standardizing organizations.

Establishment of a VOLUNTARY PRODUCT STANDARD

The role of the National Bureau of Standards in the establishment of a *Voluntary Product Standard* is to (1) act as an unbiased coordinator in the development of the standard, (2) provide editorial assistance in the preparation of the standard, (3) supply such assistance and review as is required to assure the technical soundness of the standard, (4) seek satisfactory adjustment of valid points of disagreement, (5) determine the compliance with the criteria of the Department's procedures, (6) provide secretarial functions for each committee appointed under the Department's procedures, and (7) publish the standard as a public document.

Producers, distributors, users, consumers, and other interested groups contribute to the establishment of a *Voluntary Product Standard* by (1) initiating and participating in the development of the standard, (2) providing technical or other related counsel as appropriate relating to the standard, (3) promoting the use of and support for the standard, and (4) assisting in keeping the standard current with respect to advancing technology and marketing practices.

Use of a VOLUNTARY PRODUCT STANDARD

The use of a *Voluntary Product Standard* is voluntary; the National Bureau of Standards has no regulatory power in the enforcement of the provisions of the standards. However, since the standards represent a consensus of all interested groups, their provisions are likely to become established as trade customs. In addition, when a standard is made a part of a legal document, such as a sales contract or code, compliance with the standard is enforceable.

The benefits derived from *Voluntary Product Standards* are in direct proportion to their general recognition and actual use. Producers and distributors whose products meet the requirements of a *Voluntary Product Standard* may refer to the standard in advertising and on labels to promote greater public understanding of or confidence in their products. Purchasers may order products conforming to the requirements of the standards.

For copies of the *Voluntary Product Standards* procedures or for more information concerning the development and use of these standards, you may write to: Office of Engineering Standards Services; National Bureau of Standards; Washington, D.C. 20234.

Prefinished Hardboard Paneling

Effective October 23, 1973 (See section 5.)

(This Standard, which was initiated by the American Hardboard Association, has been developed under the *Procedures for the Development of Voluntary Product Standards* of the U.S. Department of Commerce as a revision of CS 176-58, *Prefinished Hardboard Wall Panels*. See Section 6, *History of Project*, for further information.)

1. PURPOSE

The purpose of this Voluntary Product Standard is to establish nationally recognized dimensional and quality requirements for prefinished hardboard paneling and to provide producers, distributors, and users with a basis for common understanding of the characteristics of this product.

2. SCOPE

This Voluntary Product Standard covers requirements and methods of test for the dimensions, squareness, edge straightness, and moisture content of prefinished hardboard paneling; for the physical properties of the hardboard substrate; and for the finish of the paneling.¹ Methods of identifying products which conform to the requirements of this Standard are included.

Note: As an aid in correlating U.S. customary units to metric units, conversion factors for units used in this Standard are given in an appendix.

3. REQUIREMENTS

3.1. General—Products represented as complying with this Voluntary Product Standard shall meet all of the requirements specified herein. The inspection and test procedures contained in sections 3 and 4 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.

3.2. Dimensions and tolerances—The paneling shall have a nominal width of 16 inches, 4 feet, or 5 feet. The nominal lengths shall be from 4 through 12 feet in 1-foot increments. The nominal thicknesses shall be 1/8, 3/16, and 1/4 inch. The tolerance on the

nominal length and width shall be plus or minus 1/16 inch. The tolerance on the nominal thickness shall be as specified below:

Nominal thickness	Min - Max
inch	inch
1/8 (0.125)	0.115 - 0.155
3/16 (0.188)	0.165 - 0.205
1/4 (0.250)	0.210 - 0.265

Thickness measurements shall be made in accordance with the applicable method in Part B of American Society for Testing and Materials (ASTM) D 1037-72a, *Standard Methods of Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials*.²

3.3. Squareness—The length of the diagonals of the paneling shall not vary by more than 1/64 inch for each foot of length of the paneling. Opposite sides of the paneling shall not vary in length more than 1/8 inch.

3.4. Edge straightness—The edges of the paneling shall be straight within 1/64 inch for each foot of length or width, and edges and corners shall be square cut. Edge straightness shall be determined by stretching a string or wire along the edge to be measured from one corner to the adjacent corner and measuring the widest gap between the string or wire and the edge of the panel.

3.5. Moisture content—The moisture content of the paneling shall be not less than 2.0 percent nor more than 9.0 percent, and within any one shipment, shall not vary by more than 3 percentage points as measured by the moisture content of the modulus of rupture specimens. Moisture content shall be determined in accordance with the applicable test method in Part B of ASTM D 1037-72a. (Since hardboard is a woodbase material, its moisture content will vary with environmental humidity conditions. When the environmental humidity conditions in the area of intended use are a critical factor, the purchaser should specify a moisture content more restrictive than 2 to 9 percent, so that fluctuation in the moisture content of the panel will be kept to a minimum.)

¹ Other Voluntary Product Standards cover:
a. Basic hardboard
b. Hardboard siding

² Later issues of this publication may be used providing the requirements are applicable and consistent with the issue designated. Copies are obtainable from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

3.6. Hardboard substrate—The hardboard substrate of the paneling shall be manufactured primarily of inter-felted ligno-cellulosic fibers which are consolidated under heat and pressure in a hot-press to a density of not less than 31 pounds per cubic foot. The substrate shall be of any of the classes listed in table 1 and shall have the physical properties specified therein when tested in accordance with the applicable test method in Part B of ASTM D 1037-72a.

3.7. Finish—The finish of the paneling shall be either class I or class II as specified in table 2, and the properties of each class shall be determined in accordance with the sections of this Standard indicated therein.

3.8. Workmanship—All surfaces shall be uniform in appearance throughout, and shall be as free from visible defects in the surface plane as commercially practicable, when visually inspected by an individual competent in the field.

3.9. Flame Spread Index—A Flame Spread Index for the paneling shall be determined by the Tunnel Test specified in ASTM E 84-70, *Standard Method of Test for Surface Burning Characteristics of Building Materials*,³ with the paneling mounted on asbestos-cement backer boards. The panels shall then be classified as follows:

Class	Flame Spread Index
I	0 - 25
II	26 to 75
III	76 to 200
IV	over 200

3.10. Marking—All paneling represented as conforming to this Voluntary Product Standard shall be identified by one of the following methods:

- (a) Each panel shall be marked with the symbol of this Standard, PS 59-73; the name or recognized identification of the producer; the Flame Spread Index class; the finish class; the type of gloss; and the class of substrate.
- (b) The shipment or order shall be accompanied by a written certification which states that the paneling conforms to all of the requirements of Voluntary Product Standard PS 59-73, and identifies the producer, the Flame Spread Index class, the finish class, the type of gloss, and the class of substrate.

³ See footnote 2, page 1.

4. INSPECTION AND TEST PROCEDURES

4.1. Abrasion resistance—Abrasion resistance shall be determined in accordance with ASTM D 968-51, *Standard Method of Test for Abrasion Resistance of Coatings of Paint, Varnish, Lacquer, and Related Products by the Falling Sand Method*.³

4.2. Adhesion—Clean the surface of the panel with mineral spirits and allow it to dry before making a cut at least 1 inch long through the finish with a sharp razor blade. Press a piece of 3/4-inch-wide flat-back masking tape meeting the requirements of Type II tape in Federal Specification UU-T-106c, *Tape, Pressure-Sensitive Adhesive, Masking, Paper*,⁴ firmly against the finish of the panel, perpendicular to the cut. Allow the cut to extend beyond the edges of the tape and the tape to contact the finish for a distance of at least 1 inch on each side of the cut. Allow sufficient excess tape on one side to hold the tape between the thumb and forefinger. Immediately pull the tape free in a slow and even manner at right angles to the cut. Measure the distance from the cut to where the finish ceases to be "picked up" by the tape.

4.3. Fade resistance—Fade resistance shall be tested using Method A, *Continuous Exposure to Light*, of ASTM G 25-70, *Standard Recommended Practice for Operating Enclosed Carbon-Arc Type Apparatus for Light Exposure of Nonmetallic Materials*.³ Gloss shall be determined in accordance with 4.4.

4.4. Gloss—Gloss shall be determined in accordance with ASTM D 523-67, *Standard Method of Test for Specular Gloss*,³ using a glossmeter geometry of 60°.

4.5. Heat resistance—Place a 4- by 4-inch specimen in an oven at 150 °F for 24 hours.

4.6. Humidity resistance—Place a 6- by 12-inch specimen in an atmosphere of 90 percent relative humidity and temperature of 90 plus or minus 2 °F for 240 hours.

4.7. Scrape adhesion—Scrape adhesion shall be determined in accordance with Method A of ASTM D 2197-68, *Standard Methods of Test for Adhesion of Organic Coatings*.³

⁴ Later issues of this publication may be used providing the requirements are applicable and consistent with the issue designated. Copies of Federal Specifications are available from Specifications Sales (3FRDS), Bldg. 197, Washington Navy Yard, General Services Administration, Washington, D.C. 20407.

TABLE 1. Physical properties of the hardboard substrate

Class ^a	Nominal thickness	Water resistance (max av per panel)		Modulus of rupture (min av per panel)	Tensile strength (min av per panel)	
		Water absorption based on weight	Thickness swelling		Parallel to surface	Perpendicular to surface
1 Tempered	<u>inch</u>	<u>percent</u>	<u>percent</u>	<u>psi</u>	<u>psi</u>	<u>psi</u>
	1/8	20	16	7000	3500	150
	3/16	18	15			
1/4	12	11				
2 Standard	1/8	25	18	5000	2500	100
	3/16	25	18			
	1/4	20	14			
3 Service-tempered	1/8	25	22	4500	2000	100
	3/16	20	18			
	1/4	20	14			
4 Service	1/8	30	25	3000	1500	75
	3/16	27	22			
	1/4	27	22			

^a The face of these boards may either be smooth or embossed.

TABLE 2. Properties of hardboard paneling finishes

Property	Requirement		Reference to test method described in this Standard
	Class I	Class II	
Abrasion resistance	5 liters of sand without marring print	3 liters of sand without marring print	4.1
Adhesion	Less than 1/8 inch of coating "picked up"	Same as class I	4.2
Fade resistance	100 hours of light exposure with no loss of gloss and only a slight color change when visually inspected by an individual competent in the field	60 hours of light exposure with no loss of gloss and only a slight color change when visually inspected by an individual competent in the field	4.3
Gloss—High	50 units and over	Same as class I	4.4
Medium	25 to 50 units		
Low	Under 25 units		
Heat resistance	Slight color change when visually inspected by an individual competent in the field	See footnote a	4.5
Humidity resistance	No blistering, peeling, cracking, crazing, or more than a slight color change when visually inspected by an individual competent in the field	See footnote a	4.6
Scrape adhesion	6 kilograms	4 kilograms	4.7
Stain resistance	No effect using staining agents "a" through "I"	No effect using staining agents "a" through "F". Not greater than superficial effect using staining agents "g" through "I"	4.8
Steam resistance	No blistering, loosening, or separation of coating	See footnote a	4.9
Washability	No more than 5 units of change if under 50 units and no more than 10 if over 50 units	Same as class I	4.10

^a Class II finish has no heat, humidity, or steam resistance requirements as it is not meant to be used where these conditions are excessive such as around stoves, furnaces, showers, and bathtubs.

4.8. Stain resistance—Stain resistance shall be tested in accordance with ASTM D 1308-57, *Standard Method of Test for Effect of Household Chemicals on Clear and Pigmented Organic Finishes*,⁵ using the Spot Test, covered method, and the following staining agents:

- a. mineral oil (U.S.P.)
- b. fresh-brewed strong coffee
- c. china-type marking pencil
- d. nonsmearing lipstick
- e. reconstructed lemon juice (10% citric acid by weight)
- f. carbonated cola drink
- g. household ammonia solution (10% ammonia by weight)
- h. homogenized milk
- i. alcohol (denatured) 190 proof
- j. aqueous household bleach (5.5% sodium hypochlorite by weight)
- k. nail polish remover*
- l. 1% trisodium phosphate solution (by weight)

* Nail polish remover formula:

	Volume
Butyl acetate	24%
Ethyl acetate	28%
Acetone	20%
Isopropyl alcohol	24%
Diglycol laurate	4%

The staining agent shall be allowed to stand on the test specimen for 4 hours, after which time, it shall be wiped away using a damp cloth. Any stain remaining shall be gently removed by rubbing with alcohol or lacquer thinner only to the extent required to dissolve water insoluble surface stains. If 24 hours after wiping away the staining agents: (1) the specimen is free of marks and stains, then the staining agent shall be considered as having no effect; (2) any residual mark and/or stain can be easily and completely removed by the light application of a mild abrasive cleaner, then the staining agent shall be considered as having only a superficial effect. Test specimens shall be examined by holding the specimen at arm's length in a vertical position under overhead white fluorescent lamps of from 75 through 100 foot-candles.

4.9. Steam resistance—A 500-milliliter narrow-mouth Erlenmeyer flask shall be half-filled with water which shall be maintained at a mild boil. A 4-inch-square sample panel shall be suspended 1 inch above the mouth of the flask, with the finished face down, for 8 hours. The back and edges of the specimen shall be protected by an acrylic lacquer of at least 1 mil dry film thickness which will not soften or lose adhesion at 220°F. The specimen shall then be allowed to recover for 16 hours before grading. There shall be no more than a superficial change in appearance after testing.

4.10. Washability—The washability of the finish shall be determined in accordance with ASTM D

2486-69 T, *Tentative Method of Test for Scrub Resistance of Interior Latex Flat Wall Paints*,⁵ incorporating the following test equipment and procedures; Use Gardner Washability Machine, Model 105-a,⁶ or equivalent, and a Gardner long, hog bristle brush,⁶ or equivalent. Cut a specimen 6 inches by 17 inches. Determine the gloss of the coating as described in 4.4 and clamp the panel firmly in the pan of the apparatus. Soak the hog bristle brush in a 3.0 percent solution by weight of trisodium phosphate for 10 minutes, and place it on the panel. Pour 10 milliliters of the same solution on the panel, adding more solution from time to time to keep the specimen moist but not soaking wet. Remove the specimen after 3,000 cycles (6,000 separate strokes), rinse with running water, wipe off with a clean sponge, and allow the specimen to dry at a temperature of 72 plus or minus 5°F for 2 hours. Redetermine the gloss within the central 8 inches of the brush path in accordance with 4.4 and report the increase or decrease in units.

5. EFFECTIVE DATE AND IDENTIFICATION

The effective date of this Standard is October 23, 1973. After this date, the authority to refer to the superseded standard, CS 176-58, *Prefinished Hardboard Wall Panels*, as a voluntary standard developed under the Department of Commerce procedures is terminated. As of the effective date, reference to PS 59-73 may be made in contracts, codes, advertising, invoices, product labels, and the like, but no product may be advertised or represented in any manner which would imply or tend to imply approval or endorsement of that product by the National Bureau of Standards, the Department of Commerce, or by the Federal Government.

The following statements are suggested for use in representing products as conforming to all requirements of this Standard:

- (1) "This prefinished hardboard paneling with class — finish, — gloss, class — flame spread index, and class — substrate conforms to all requirements established in Voluntary Product Standard PS 59-73, developed and published in accordance with the U.S. Department of Commerce *Procedures for the Development of Voluntary Product Standards*. Full responsibility for the conformance of this product to the standard is assumed by (name and address of producer or distributor)."
- (2) "Conforms to PS 59-73, with class — finish, — gloss, class — flame spread index, and class — substrate, (name and address of producer or distributor)."

⁵ See footnote 2, page 1.

⁶ Available from Gardner Laboratories, Inc., 5521 Landy Lane, Bethesda, Maryland 20014. This trade name is used solely for the purpose of description and does not imply recommendation or endorsement by the National Bureau of Standards. Other such apparatus equal in performance shall be acceptable.

6. HISTORY OF PROJECT

Commercial Standard CS 176-58, *Prefinished Hardboard Wall Panels*, was developed at the request of the American Hardboard Association and was published in 1958.

In 1969, the American Hardboard Association requested that the National Bureau of Standards initiate a revision of CS 176-58 under the *Procedures for the Development of Voluntary Product Standards*. A proposed revision was submitted to the Standing Committee in August 1972; the response from the Standing Committee indicated that certain changes to the standard were necessary. A new proposal was approved by the Standing Committee in May 1973. The recommended revision was then circulated for acceptance in July 1973. The response to this circulation indicated consensus among producers, distributors, and users in accordance with the published procedures.

The new edition of the Standard was designated Voluntary Product Standard PS 59-73, *Prefinished Hardboard Paneling*, and became effective on October 23, 1973.

Technical Standards Coordinator:

Karl G. Newell, Jr., Office of Engineering Standards Services, National Bureau of Standards, Washington, D.C. 20234

7. STANDING COMMITTEE

A Standing Committee has been appointed to assist in keeping this Voluntary Product Standard up to

date. The names of the members of the committee are available from the Office of Engineering Standards Services, Washington, D.C. 20234, which serves as the secretariat of the committee.

APPENDIX

The conversion factors and units contained in this appendix are in accordance with the International System of Units (Abbreviated SI for *Système International d'Unités*). The SI was defined and given official status by the 11th General Conference on Weights and Measures which met in Paris in October 1960. For assistance in converting U.S. customary units to SI units, see ASTM E 380, *ASTM Standard Metric Practice Guide*, available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103. The conversion factors for the units found in this Standard are as follows:

1 inch = 25.4 millimeters

1 foot = 0.3048 meter

1 pound per square inch = $6.894\ 757 \times 10^3$ pascals
(newton/meter²)

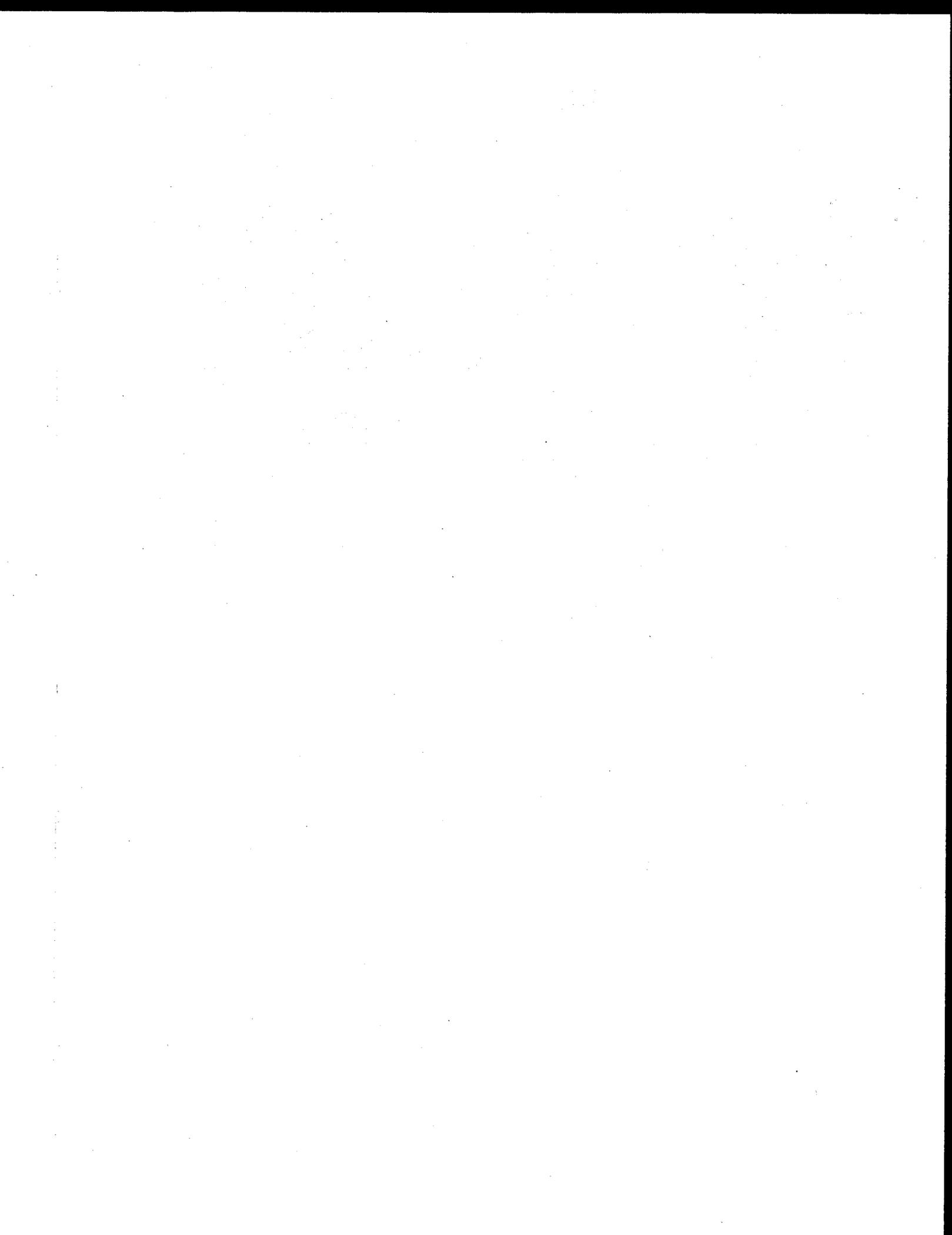
1 foot-candle = 10.76391 lux

$t_C = (t_F - 32)/1.8$

where:

t_C = temperature in degrees Celsius

t_F = temperature in degrees Fahrenheit



NATIONAL BUREAU OF STANDARDS

The National Bureau of Standards¹ was established by an act of Congress March 3, 1901. The Bureau's overall goal is to strengthen and advance the Nation's science and technology and facilitate their effective application for public benefit. To this end, the Bureau conducts research and provides: (1) a basis for the Nation's physical measurement system, (2) scientific and technological services for industry and government, (3) a technical basis for equity in trade, and (4) technical services to promote public safety. The Bureau consists of the Institute for Basic Standards, the Institute for Materials Research, the Institute for Applied Technology, the Institute for Computer Sciences and Technology, and the Office for Information Programs.

THE INSTITUTE FOR BASIC STANDARDS provides the central basis within the United States of a complete and consistent system of physical measurement; coordinates that system with measurement systems of other nations; and furnishes essential services leading to accurate and uniform physical measurements throughout the Nation's scientific community, industry, and commerce. The Institute consists of a Center for Radiation Research, an Office of Measurement Services and the following divisions:

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Computer Services — Systems and Software — Computer Systems Engineering — Information Technology.

THE OFFICE FOR INFORMATION PROGRAMS promotes optimum dissemination and accessibility of scientific information generated within NBS and other agencies of the Federal Government; promotes the development of the National Standard Reference Data System and a system of information analysis centers dealing with the broader aspects of the National Measurement System; provides appropriate services to ensure that the NBS staff has optimum accessibility to the scientific information of the world. The Office consists of the following organizational units:

Office of Standard Reference Data — Office of Information Activities — Office of Technical Publications — Library — Office of International Relations.

¹ Headquarters and Laboratories at Gaithersburg, Maryland, unless otherwise noted; mailing address Washington, D.C. 20234.

² Part of the Center for Radiation Research.

³ Located at Boulder, Colorado 80302.

⁴ Part of the Center for Building Technology.