

**U.S. Department of Commerce
National Institute of Standards and Technology
(former National Bureau of Standards-NBS)**

**NBS Voluntary Product Standard PS51-71
Hardwood and Decorative Plywood**

Product Standard (PS) 51-71, Hardwood and Decorative Plywood was withdrawn by the U.S. Department of Commerce on March 21, 1983.

The following standard was used to replace PS51-71:
ANSI/HPMA HP-1983, Hardwood and Decorative Plywood

ANSI/HPVA HP-1:2004, American National Standard for Hardwood and Decorative Plywood

For assistance and additional information concerning this standard and/or other related standards, contact:

Hardwood Plywood and Veneer Association (HPVA)
(formerly Hardwood Plywood Manufacturers Association-HPMA)
P.O. Box 2789
Reston, VA 20195
Telephone: 703 435 2900
Fax: 703 435 2573
E-mail: hpva@hpva.org or
Laboratory & Technical Services E-mail: testlab@hpva.org
<http://www.hpva.org>

American National Standards Institute (ANSI)
25 West 43rd Street, Fourth Floor
New York, NY 10036
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E-mail: info@ansi.org
<http://www.ansi.org> (e-standards)
<http://www.nssn.org>

possible in terms of quality, quantity, timeliness and efficiency.

Include the principal costs involved for achieving work plan under Cooperative Agreement by completing Part III—the Budget Information Section of the Request for Application.

Provide cost sharing plan information in terms of methodology and format for billing the cost of management and technical assistance to clients.

Total project cost will be evaluated in terms of:

—Clear explanations of all expenditures proposed, and

—The extent to which the applicant can leverage federal program funds and operate with economy and efficiency.

In conclusion, the applicant's schedule for start of BDC operation should be included in Part Two. Part Two will be known as the applicant's plan of operation and will be incorporated into the Cooperative Agreement award.

A detailed justification all proposed costs is required for Part Four and each item must be fully explained.

The failure to supply information in any given category of the criteria will result in the application being considered non-responsive and consequently, dropped from competition.

All information submitted is subject to verification by MBDA.

E. Disposition of Proposals

Notification of awards will be made by the Grants Officer. Organizations whose proposals are unsuccessful will be advised by the Regional Director.

F. Proposal Instructions and Forms

Questions concerning the preceding information and copies of application forms must be obtained at the above address.

Nothing in this solicitation shall be construed as committing MBDA to divide available funds among all qualified applicants. The program is subject to OMB Circular A-95 requirements.

G. A Pre-Application conference to assist all interested applicants will be held at the Federal Building—536 South Clark Street—Room 638 A & B—Chicago Illinois on February 8, 1982 at 10:00 a.m.

(1100 Minority Business Development (Catalog of Federal Domestic Assistance))

Dated: January 12, 1982.

Stanley W. Tate,
Regional Director.

(FR Dec. 22-1982 Filed 1-19-82; 9:46 am)
BILLING CODE 3010-21-M

National Bureau of Standards

Status Report on Voluntary Product Standards

AGENCY: National Bureau of Standards; Commerce.

ACTION: Maintenance, retention, replacement, and withdrawal of certain voluntary product standards

On August 19, 1980, the Department of Commerce (Department) announced in the Federal Register (45 FR 55250-2) the status of 80 documents classified as Voluntary Product Standards. The announcement was made in accordance with the revised Procedures for the Development of Voluntary Product Standards (15 CFR Part 10). Section 10.0(b) of the Procedures specifies six criteria that must be met for the Department to sponsor the development or maintenance of a Voluntary Product Standard.

Numerous requests to retain or maintain various standards were received in response to the August 19, 1980, notice. A number of the requests specified retention of standards for fixed periods of time that have now elapsed. The current status of all such standards is indicated below.

Based on proposals from the proponent organizations identified after the following titles, the following product standards will continue to be sponsored by the Department:

- PS 1-74, Construction and Industrial Plywood; American Plywood Association
- PS 20-70, American Softwood Lumber Standard; American Lumber Standards Committee
- PS 72-76, Toy Safety; Toy Manufacturers of America
- PS 73-77, Carbonated Soft Drink Bottles; Glass Packaging Institute
- TS 231, Proposed Voluntary Product Standard, Production of Carbonated Soft Drinks in Glass Bottles; National Soft Drink Association

Based on documented activity within a private standards-writing organization, the following standards will be retained by the National Bureau of Standards for the periods of time stated below to permit the orderly transfer of sponsorship of such standards from the Department to the identified organizations. The periods of time stated below shall commence from the date this notice is published in the Federal Register and supersede the periods of time stated for those standards in the August 19, 1980 notice.

- PS 30-70, School Chalk; the Crayon, Water Color and Craft Institute, Inc.; 6 months
- PS 38-70, Body Measurements for the Sizing of Boys' Apparel; Mail Order Association of America; 12 months

- PS 42-70, Body Measurements for the Sizing of Women's Patterns and Apparel; Mail Order Association of America; 12 months
- PS 45-71, Body Measurements for the Sizing of Apparel for Young Men (Students); Mail Order Association of America; 12 months
- PS 46-71, Flame-Resistant Paper and Paperboard; American Society for Testing and Materials; 6 months
- PS 51-71, Hardwood and Decorative Plywood; Hardwood Plywood Manufacturers Association; 12 months
- PS 54-72, Body Measurements for the Sizing of Girls' Apparel; Mail Order Association of America; 12 months
- PS 63-75, Latex Foam Mattresses for Hospitals; American Society for Testing and Materials; 12 months
- PS 64-75, School Paste; The Crayon Water Color and Craft Institute, Inc.; 6 months
- PS 65-75, Paints and Inks for Art Education in Schools; The Crayon, Water Color and Craft Institute, Inc.; 6 months
- PS 67-76, Marking of Gold Filled and Rolled Gold Plate Articles Other Than Watchcases; Jewelers Vigilance Committee; 24 months
- PS 68-76, Marking of Articles Made of Silver in Combination with Gold; Jewelers Vigilance Committee; 24 months
- PS 69-76, Marking of Articles Made Wholly or in Part of Platinum; Jewelers Vigilance Committee; 2 months
- PS 70-76, Marking of Articles Made of Karat Gold; Jewelers Vigilance Committee; 24 months
- PS 71-76, Marking of Jewelry and Novelties of Silver; Jewelers Vigilance Committee; 24 months
- CS 98-82, Artists Oil Paints; Artists Equity Association, Inc.; 8 months
- CS 130-80, Color Materials for Art Education in Schools; the Crayon, Water Color and Craft Institute, Inc.; 6 months
- CS 151-50, Body Measurements for the Sizing of Apparel for Infants, Babies, Toddlers and Children (for the Knit Underwear Industry); Mail Order Association of America; 12 months
- R 192-83, Crayons and Related Art Materials for School Use (Types, Sizes, Packages and Colors); The Crayon, Water Color and Craft Institute, Inc.; 6 months

The following standard has been replaced by a standard being developed or published by a private standards-writing organization and, therefore, Department of Commerce sponsorship is no longer need for it:

- PS 17-69, Polyethylene-sheeting (construction, industrial and agricultural applications); Society of the Plastics Industry

In the absence of any request for retention or maintenance, the following standards are withdrawn:

- PS 13-69, Uncorded Slab Urethane Foam for Bedding and Furniture Cushioning
- PS 16-69, Custom Contact-Molded Reinforced Polyester Chemical-Resistant Process Equipment
- PS 23-70, Horticultural Grade Perlite

— Over —

PS 24-70, Melamine Dinnerware (Alpha-Cellulose Filled) for Household Use
 PS 25-70, Heavy-Duty Alpha-Cellulose-Filled Melamine Tableware
 PS 27-70, Mosaic-Parquet Harwood Slat Flooring
 PS 29-70, Plastic Heat-Shrinkable Film
 PS 31-70, Polystyrene Plastic Sheet
 PS 34-70, Fluorinated Ethylene-Propylene (FEP) Plastic-Lined Steel Pipe and Fittings
 PS 52-71, Polytetrafluorethylene (PTFE)
 PS 53-72, Glass-Fiber Reinforced Polyester Structural Plastic Panels
 PS 56-73, Structural Glued Laminated Timber
 PS 57-73, Cellulosic Fiber Insulation Board
 PS 58-73, Basic Hardboard
 PS 59-73, Prefinished Hardboard Paneling
 PS 60-73, Hardboard Siding
 PS 62-74, Grading of Diamond Powder in Sub-Sieve Sizes
 CS 138-55, Insect Wire Screening
 CS 192-53, General Purpose Vinyl Plastic Film
 CS 201-55, Rigid Polyvinyl Chloride Sheets
 CS 227-59, Polyethylene Film
 CS 245-82, Vinyl-Metal Laminates
 CS 257-83, TFE-Fluorocarbon (Polytetrafluorethylene) Resin Molded Basic Shapes
 CS 268-85, Hide-Trim Pattern for Domestic Cattlehides
 CS 274-88, TFE-Fluorocarbon Resin Sintered Thin Coatings for Dry Film Lubrication
 R2-82, Bedding Products and Components

In accordance with § 10.1(e) of the revised Procedures for the Development of Voluntary Product Standards and by agreement with the Consumer Product Safety Commission, the Department will retain sponsorship of the following Voluntary Product Standard for the period of time stated below to allow for arrangements to be made for its sponsorship by a private standards writing organization.

PS 66-75, Safety Requirements for Home Playground Equipment; 12 months

For further information contact Eric A. Vadelund, Office of Engineering Standards, National Bureau of Standards, Washington, D.C. 20234. Telephone: (301) 921-3272.

Dated: January 13, 1982.

Ernest Ambler,
 Director.

[FR Doc. 82-2316 Filed 1-19-82; 8:45 am]
 BILLING CODE 3510-13-M

National Bureau of Standards' Visiting Committee; Meeting

Pursuant to the Federal Advisory Committee Act, U.S.C. App., notice is hereby given that the National Bureau of Standards' Visiting Committee will meet on Thursday, February 25, 1982, from 9:00 a.m. to 1:50 p.m. in Lecture Room 1107, Radio Building, National Bureau of Standards, 325 Broadway, Boulder, Colorado, after which time the Visiting

Committee members will meet with a number of NBS scientists in their various offices and laboratories until 4:30 p.m.

The NBS Visiting Committee is composed of five members prominent in the fields of science and technology and appointed by the Secretary of Commerce.

The purpose of the meeting is to review the efficiency of the Bureau's scientific work and the condition of its equipment in order to assist the Committee in reporting to the Secretary of Commerce as required by law.

The public is invited to attend, and the Chairman will entertain comments or questions at an appropriate time during the meeting.

Any person wishing to attend the meeting should inform Mrs. Carolyn Goodfellow, Office of the Director, National Bureau of Standards, Washington, DC 20234, telephone (301) 921-2226.

Dated: January 15, 1982.

Ernest Ambler,
 Director.

[FR Doc. 82-1382 Filed 1-19-82; 8:45 am]
 BILLING CODE 3510-13-M

National Conference on Weights and Measures; Meeting

Notice is hereby given that the interim meetings of the National Conference on Weights and Measures will be held January 25-29, 1982, at the National Bureau of Standards, Gaithersburg, Maryland.

The National Conference on Weights and Measures is an organization of weights and measures enforcement officials of the States, counties, and cities of the United States. The interim meetings of the Conference, as well as the annual meeting to be held next July (a notice will be published in the Federal Register prior to such meeting), brings together the enforcement officials, other government officials, and representatives of business, industry, trade associations, and consumer organizations for the purpose of hearing and discussing subjects that relate to the fields of weights and measures technology and administration.

Pursuant to authority in its Organic Act (15 U.S.C. 272(f)), the National Bureau of Standards acts as a sponsor of the National Conference on Weights and Measures in order to promote uniformity among the States in the complex of laws, regulations, methods, and testing equipment that comprises regulatory control by the States of commercial weighing and measuring.

The public is invited to attend. Additional information concerning the Conference program and arrangements may be obtained from Mr. Albert D. Tholen, Executive Secretary, National Conference on Weights and Measures, National Bureau of Standards, Washington, DC 20234; telephone: (301) 921-2401.

Dated: January 15, 1982.

Ernest Ambler,
 Director.

[FR Doc. 82-1428 Filed 1-19-82; 8:45 am]
 BILLING CODE 3510-13-M

DEPARTMENT OF DEFENSE

Department of the Air Force

USAF Scientific Advisory Board; Meeting

The USAF Scientific Advisory Board Ad Hoc Committee on Command, Control and Communications Countermeasures (C²CM) Data Base will hold meetings on February 18, 1982, from 8:00 a.m. to 5:00 p.m., and February 19, 1982, from 8:00 a.m. to 12:00 noon, in the Electronic Security Command Conference Room, Building 2000, Kelly Air Force Base, Texas.

The ad hoc committee will hold classified discussions on: (1) the overall systems analysis which is the keystone of the C²CM data base problem; (2) the design and sizing of the data processing resources, and (3) the interface with existing source data bases maintained by the intelligence and operational communities and with user systems for target applications.

The meetings concern matters listed in section 592b(c), Title 5, United States Code, specifically subparagraph (1) thereof, and accordingly the meetings are closed to the public.

For further information, contact the Scientific Advisory Board Secretariat at (202) 697-8404.

Winnibel F. Holmes,

Air Force Federal Register Liaison Officer.

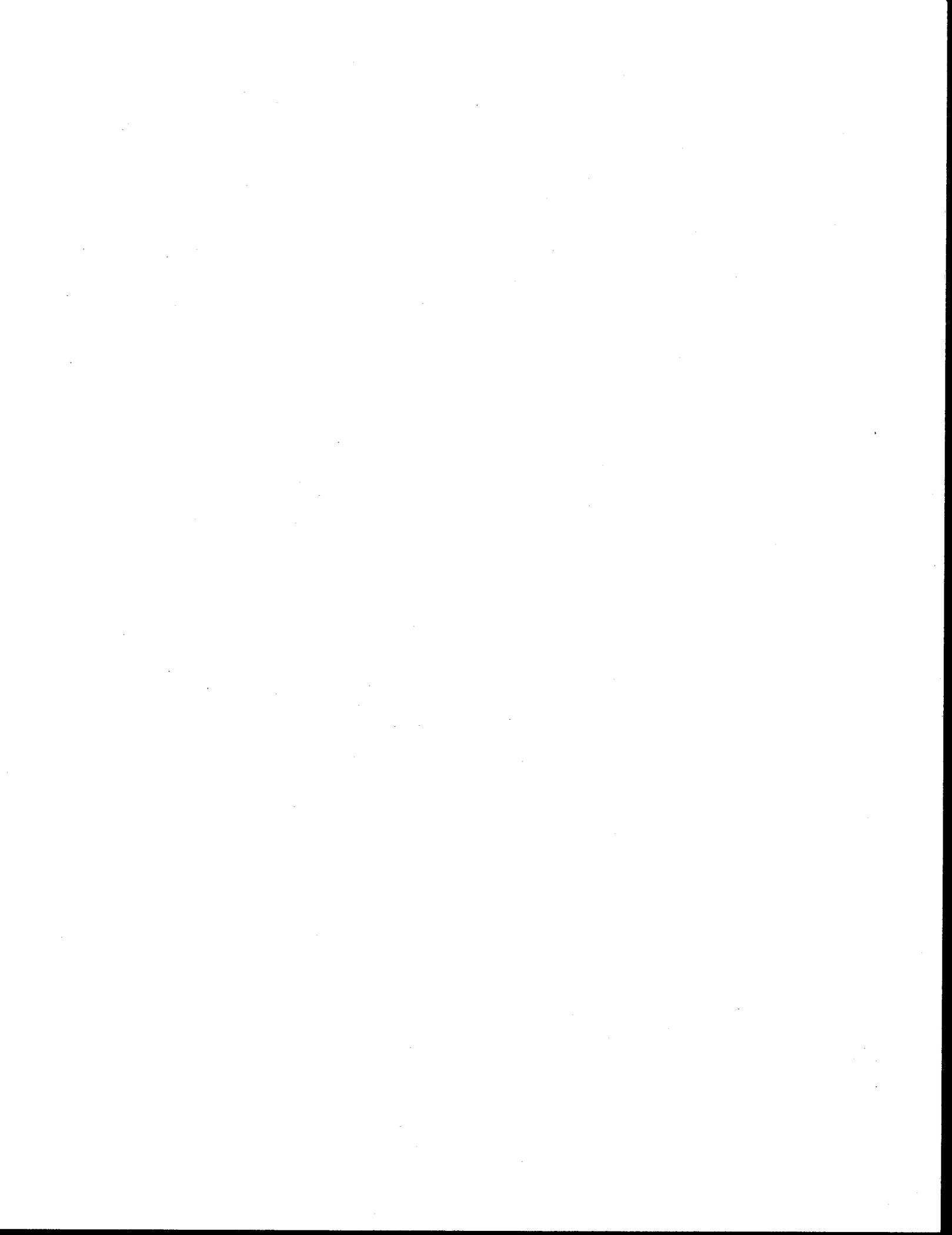
[FR Doc. 82-1367 Filed 1-19-82; 8:45 am]
 BILLING CODE 3510-01-M

DEPARTMENT OF ENERGY

Office of Assistance Secretary for International Affairs

International Atomic Energy Agreements; Civil Uses; Proposed Subsequent Arrangement Between U.S. and Australia

Pursuant to section 131 of the Atomic Energy Act of 1954, as amended (42



DO NOT REMOVE

WITHDRAWN

A UNITED STATES
DEPARTMENT OF
COMMERCE
PUBLICATION



NBS
Publi-
cations

NBS Voluntary Product Standard

PS 51-71

Hardwood and Decorative Plywood

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

UNITED STATES DEPARTMENT OF COMMERCE • Maurice H. Stans, *Secretary*

NATIONAL BUREAU OF STANDARDS • Lewis M. Branscomb, *Director*

Voluntary Product Standard

PS 51-71

Hardwood and Decorative Plywood

Technical Standards Coordinator: P. R. Sutula

Abstract

This Voluntary Product Standard for hardwood and decorative plywood establishes the nationally recognized marketing classifications, quality criteria, test methods, definitions, and grade-marking and certification practices for plywood produced primarily from hardwoods. It is intended for voluntary use by reference in trade literature, catalogs, sales contracts, building codes, and procurement specifications to describe the quality aspects of the product and the means to determine conformance.

Requirements are given for wood species, veneer grading, lumber-core, particleboard-core, hardboard-core, glue bond, panel constructions, dimensions, moisture content, sanding, and finishing. Sampling and testing provisions cover dry shear, cyclic-boil, three cycle wet and dry, and cold soak test methods for plywood delamination determinations, and field and laboratory moisture content measuring methods. A glossary of trade terms is provided for better communication and understanding, and provisions are made for panel grade-marking and certification to indicate compliance.

Key words: Decorative plywood; hardwood plywood; plywood, hardwood and decorative; softwood plywood, decorative; veneer grades, decorative softwood and hardwood.

Nat. Bur. Stand. (U.S.), Prod. Stand. 51-71, 18 pages (January 1972)
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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.

Hardwood and Decorative Plywood

Effective August 15, 1971 (See section 8.)

(This Standard, initiated by the Hardwood Plywood Manufacturers Association, 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 Commercial Standard CS 35-61, *Hardwood Plywood*. See Section 9, *History of Project*, for further information.)

1. PURPOSE

1.1. Purpose—The purpose of this Voluntary Product Standard is to establish nationally recognized quality criteria for the principal types, grades, and sizes of hardwood and decorative plywood. The principal wood species used for hardwood and decorative plywood are hardwoods; however, certain softwood species are also used.¹ The Standard is intended to provide producers, distributors, architects, contractors, builders, and users with a basis for common understanding of the characteristics of this product.

1.2. Intended use—The plywood covered by this Voluntary Product Standard is intended for use as decorative wall panels where esthetic characteristics are important; for cut-to-size and stock panels used for furniture, cabinets, containers, and specialty products; and for marine applications.²

2. SCOPE AND CLASSIFICATION

2.1. Scope—This Voluntary Product Standard covers the principal types, grades, and constructions of plywood made primarily with hardwood faces. Included are requirements for wood species and veneer grading; for lumber, particleboard, and hardboard cores; and for glue bond, panel construction, moisture content, and panel dimensions and tolerances. Test procedures are provided for determining conformance with the requirements. Definitions of trade terms, methods of ordering, and methods for identifying products that conform to this Standard are included.

2.2. Classification—Plywood covered by this Standard is classified as follows:

2.2.1. Species—The most commonly marketed species for plywood faces are listed in table 1.

2.2.2. Grades of veneers—The grades of ve-

neers are listed below with the identification symbol for each grade:

Premium grade	(A)
Good grade	(1)
Sound grade	(2)
Utility grade	(3)
Backing grade	(4)
Specialty grade	(SP)

2.2.3. Types of plywood—The types of plywood are listed below in descending order of water-resistance capability. (See table 5.)

Technical	— (Exterior)
Type I	— (Exterior)
Type II	— (Interior)
Type III	— (Interior)

2.2.4. Constructions — The constructions, based on the kind of core, are listed below:

1. Hardwood veneer core (3-ply, 5-ply, etc. in odd numbers of plies)
2. Softwood veneer core (3-ply, 5-ply, etc. in odd numbers of plies)
3. Hardwood lumber core (3-ply, 5-ply, and 7-ply)
4. Softwood lumber core (3-ply, 5-ply, and 7-ply)
5. Particleboard core (3-ply and 5-ply)
6. Hardboard core (3-ply)
7. Special core (3-ply or more)

2.2.5. Sizes and thicknesses—Most combinations of length, width, and thickness are available. The common panel sizes are 48 by 84 inches, 48 by 96 inches, and 48 by 120 inches (1 inch equals 25.4 millimeters) with thicknesses ranging from $\frac{1}{8}$ to $\frac{3}{4}$ inch.

3. REQUIREMENTS

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

3.2. Species for faces, backs, and inner plies—The species for the face shall be any hardwood species, and if used for decorative faces, any softwood species listed in table 1 may be used. The panels shall be identified by the species of

¹This Voluntary Product Standard also includes certain decorative softwood species for nonconstruction uses. Construction grades of softwood and hardwood plywood are covered in the latest edition of Voluntary Product Standard PS 1-66, *Softwood Plywood, Construction and Industrial*.

²Additional product information is available from the Hardwood Plywood Manufacturers Association, 2510 S. Walter Reed Drive, Arlington, Virginia 22206.

the face (see 3.14). The species of the back and the inner plies may be any hardwood or softwood species.

TABLE 1. *Categories of commonly used species based on specific gravity ranges^a*

Category A species (0.56 or more specific gravity)	Category B species (0.43 through 0.55 specific gravity)	Category C species (0.42 or less specific gravity)
Ash, Commercial White	Ash, Black	Alder, Red
Beech, American	Avodire	Aspen
Birch, Yellow, Sweet	Bay	Basswood, American
Bubinga	Cedar, Eastern	Box Elder
Elm, Rock	Cherry, Black	Catipo
Madrone, Pacific	Chestnut, American	Cedar, Western Red ^b
Maple, Black (hard)	Cypress ^b	Ceiba
Maple, Sugar (hard)	Elm, American (white, red, or gray)	Cottonwood, Black
Oak, Commercial Red	Fir, Douglas ^b	Cottonwood, Eastern
Oak, Commercial White	Gum, Black	Pine, White and Ponderosa ^b
Oak, Oregon	Gum, Sweet	Poplar, Yellow
Paldao	Hackberry	Redwood ^b
Pecan, Commercial	Lauan, (Philippine Mahogany)	Willow, Black
Rosewood	Limba	
Sapele	Magnolia	
Teak	Mahogany, African	
	Mahogany, Honduras	
	Maple, Red (soft)	
	Maple, Silver (soft)	
	Prima Vera	
	Sycamore	
	Tupelo, Water	
	Walnut, American	

^a Based on oven-dry weight and volume at 12 percent moisture content.

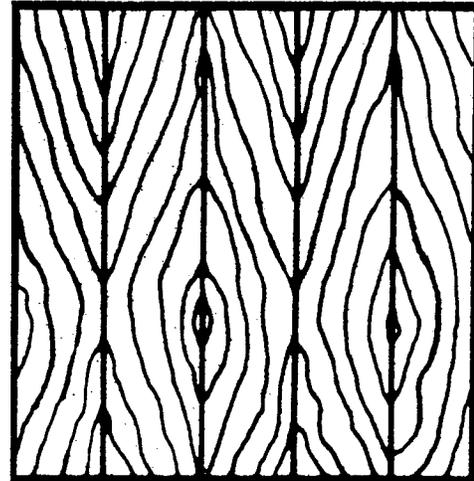
^b Softwood.

3.2.1. Species categories—Species of wood commonly used for veneers are listed in table 1 and are categorized by specific gravity for the purpose of establishing maximum veneer thicknesses (see table 5). The specific gravity ranges given in the three category headings shall also be used in determining the proper category for unlisted species. The Forest Products Laboratory in Madison, Wisconsin, shall be considered as final evaluator of specific gravity data.

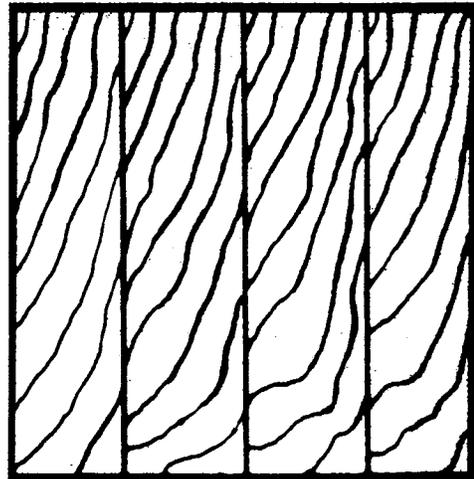
3.3. Veneer grade descriptions—The grade requirements and identification symbols for hardwood veneers are given in 3.3.1 through 3.3.6. Softwood veneer requirements are given in 3.3.7. When unsanded veneers are graded, such characteristics as patches, rough areas of grain, shallow depressions, open splits, and machine marks which may be corrected by sanding are not considered. Panels shall be identified by the veneer grade of the face (see 3.14). A grading tolerance of 5 percent of the shipment or order will be permitted (see appendix).

3.3.1. Premium grade (A)—The veneer shall be smooth, tight-cut, and full-length. When used

as a face and when it consists of more than one piece, it shall be edge-matched as outlined in



BOOK MATCHING



SLIP MATCHING

FIGURE 1. *Face matching.*

table 2, and as illustrated in figure 1. Edge joints shall be tight. The natural and other characteristics, the types of matching which will be permitted for each species, and the defects which will not be permitted shall be as specified in table 2. Hardwood veneers of species not covered in table 2 may contain small burls, occasional pin knots, color streaks or spots, inconspicuous small patches, and usual characteristics inherent in the given species; however, knots (other than pin knots), wormholes, rough-cut veneer, splits, shake, and doze and other forms of decay will not be permitted.

3.3.2. Good grade (1)—The veneer shall be smooth, tight-cut, and full-length. When used as a face and when it consists of more than one piece, the edge joints shall be tight. The pieces need not be matched for color or grain, but sharp contrasts between adjacent pieces of veneer with respect to grain, figure, and natural character markings will not be permitted. The natural and other characteristics which will be permitted for each species and the defects which will not be permitted shall be as listed in table 2. Veneers of species not covered in table 2 may contain small burls, pin knots, color streaks or spots, inconspicuous patches, and usual characteristics in-

herent in the given species; however, knots (other than pin knots), wormholes, rough-cut veneer, splits, shake, and doze and other forms of decay will not be permitted.

3.3.3. Sound grade (2)—The veneer shall be free from open defects. Matching for grain or color is not required. The natural and other characteristics which will be permitted and the defects which will not be permitted shall be as listed in table 3.

3.3.4. Utility grade (3)—The natural and other characteristics which will be permitted and the defects which will not be permitted shall be as listed in table 3.

TABLE 3. Summary of veneer characteristics and allowable defects of Sound, Utility, and Backing Grades

Defects	Sound Grade (2) ^a	Utility Grade (3) ^a	Backing Grade (4) ^a
Sapwood	Yes	Yes	Yes
Discoloration & Stain	Yes	Yes	Yes
Mineral Streaks	Yes	Yes	Yes
Sound Tight Burls	Max. diam. 1"	Yes	Yes
Sound Tight Knots	Max. diam. ¾"	Yes	Yes
Knotholes	No	Max. diam. 1"	Max. diam. 3"
Wormholes	Filled or Patched ^b	Yes	Yes
Open Splits or Joints	No	Yes; 3/16" for one-half length of panel	1" for one-fourth length of panel; ½" for one-half length of panel; ¼" for full length of panel
Doze & Decay	Firm areas of doze	Firm areas of doze in face. Areas of doze and decay in inner plies and backs provided serviceability of panel is not impaired.	Areas of doze and decay provided serviceability of panel is not impaired.
Rough Cut	Small area	Small area	Yes
Patches	Yes	Yes	Yes
Crossbreaks and Shake	No	Max. 1" in length	Yes
Bark Pockets	No	Yes	Yes
Brashness	No	No	Yes
Gum Spots	Yes	Yes	Yes
Laps	No	Yes	Yes

^a Defects permitted in Premium and Good Grades will be allowed in this grade (see tables 2 and 4).

^b Unfilled, inconspicuous, vertical wormholes not larger than 1/16" in diameter will be permitted in tropical hardwoods.

3.3.5. Backing grade (4)—The natural and other characteristics which will be permitted and the defects which will not be permitted shall be as listed in table 3.

3.3.6. Specialty grade (SP)—This grade shall include veneer possessing characteristics unlike any of those described for the above-mentioned grades. Characteristics shall be as agreed upon between buyer and seller. Species such as wormy chestnut, birdseye maple, and English brown oak which have unusual decorative features are considered as Specialty Grade. (Wall panel veneer face grades generally fall in this category.)

3.3.7. Softwood veneers—The face grade requirements for certain decorative softwoods shall be as listed in table 4. All other softwoods for faces, backs, or inner plies shall meet the same grading requirements as specified for hardwoods in 3.3.1 through 3.3.6.

3.4. Thickness of veneers—The maximum veneer thicknesses shall be as provided in table

5. The minimum thicknesses of veneers shall be as agreed upon between buyer and seller.

3.5. Lumber cores—Lumber cores shall be of any species, except that mixing of species in a single core will not be permitted. The maximum permissible widths of core strips shall be 2½ inches for Category A species (see 3.2.1), 3 inches for Category B species, and 4 inches for Category C species. Core grades and core banding requirements shall be as described in 3.5.1 through 3.5.5. Cores shall be conditioned after gluing to equalize moisture content before sanding.

3.5.1. Clear grade—The wood strips shall be full length or finger-jointed and shall be free of knots or other defects which would not properly shape or mold, except that discolorations will be permitted. Wood patches or plugs shall not be used, but wood filler will be permitted.

3.5.2. Sound grade—The wood strips shall be full length or finger-jointed and shall be free

TABLE 4. Summary of veneer characteristics and allowable defects for Premium Grade and Good Grade decorative softwood species

Characteristics	Rotary — Sliced — Knotty Veneer				Sliced — Vertical grain			
	Western red cedar		White pine		Douglas fir		Redwood	
	Premium (A)	Good (1)	Premium (A)	Good (1)	Premium (A)	Characteristics	Premium (A)	Premium (A)
Discoloration	No	Slight	No	Slight	Sapwood	Limited ^d	No	No
Burls	Yes	Yes	Yes	Yes	Heartwood	Yes ^e	Yes ^e	Yes ^e
Knots	—	—	—	—	Color streaks	No	No	No
Pin knots	Yes	Yes	Yes	Yes	Color variation	Slight	Slight	Slight
Sound knots	Yes	Yes	Yes	Yes	Mineral streaks	No	No	No
Spike knots	Slight	Yes ^b	Slight	Yes ^b	Small burls	Yes	Yes	Yes
Filled knot holes ^a	1/4 in.	1 1/2 in.	1/4 in.	1 1/2 in.	Pin knots	No	No	No
Worm holes	No	No	No	No	Worm holes	No	No	No
Open splits or joints	No	No	No	No	Open splits or joints	No	No	No
Doze	No	No	No	No	Shake or doze	No	No	No
Rough cut	No	Inconspicuous	No	Inconspicuous	Rough cut	No	No	No
Inconspicuous patches	Small	Yes	Small	Yes	Crossbars	No	No	No
Pitch streaks	Small	Small	Small	Small	Inconspicuous patches	Yes	Yes	Yes
Pitch pockets	No	Small	No	Small	Pitch streaks	Small	No	No
Crow's foot	Slight	Occasional	No	No	Pitch pockets	No	No	No
Matching	a or c	a or c	a or c	a or c	Matching	c or f	c or f	c or f

^a Randomly spaced for pleasing appearance.
^b Maximum 2 inches.
^c Slip matched. Must be matched in sequence with tight side out.
^d Bright sapwood not permitted.
^e Six or more annual rings per inch.
^f Book matched. Matched for color and grain at the joints.

TABLE 5. Limiting criteria for plywood

Limiting factors	Technical (Exterior)		Type I* (Interior)		Type II (Interior)		Type III (Interior)	
	Technical (Exterior)	Type I* (Exterior)	Technical (Exterior)	Type I* (Interior)	Technical (Exterior)	Type II (Interior)	Technical (Exterior)	Type III (Interior)
Glue bond (3.9)	Fully waterproof	Fully waterproof	Fully waterproof	Fully waterproof	Water resistant	Water resistant	Moisture resistant	Moisture resistant
Adhesive performance (3.9)	Dry and cyclic	Dry and cyclic	Dry and cyclic	Dry and cyclic	3-cycle soak	3-cycle soak	2-cycle soak	2-cycle soak
Species or specific gravity category of veneer (3.2)	boil shear	boil shear	boil shear	boil shear	Specify	Specify	Specify	Specify
Veneer edge joints (3.3)	No tape	No tape	No tape	No tape	Tape	Tape	Tape	Tape
Grade of faces or face and back (3.3)	Specify	Specify	Specify	Specify	Specify	Specify	Specify	Specify
Grade of hardwood inner plies adjacent to faces (3.3) ^b	2 under A or 1	2 under A or 1	2 under A or 1	2 or 3	2 or 3 ^c	2 or 3 ^c	2 or 3 ^c	2 or 3 ^c
Grade of softwood inner plies adjacent to faces (3.3.7) ^b	3 under 2	3 under 2	3 under 2	2 or 3	2 or 3 ^c	2 or 3 ^c	2 or 3 ^c	2 or 3 ^c
Grade of other inner plies (3.3.1 through 3.3.7)	3 or 4	3 or 4	3 or 4	3 or 4	(4 under 3 or 4)	(4 under 3 or 4)	3 or 4	3 or 4
Grade of lumber core (3.5)	Not suitable	Not suitable	Not suitable	Specify	Specify	Specify	Specify	Specify
Particleboard or hardboard core (3.6)	Not suitable	Not suitable	Not suitable	Specify	Specify	Specify	Specify	Specify
Maximum veneer thickness in inches by specific gravity category (3.2.1):								
Category A	1/12	1/12	1/12	1/8	3/16	3/16	3/16	3/16
Category B	1/10	1/10	1/10	3/16	1/4	1/4	1/4	1/4
Category C	1/8	1/8	1/8	1/4	1/4	1/4	1/4	1/4
Percentage of wood in face direction	40 to 60	40 to 60	40 to 60	No limitation	No limitation	No limitation	No limitation	No limitation
Sanding (3.11)	Specify	Specify	Specify	Specify	Specify	Specify	Specify	Specify

^a Not recommended for continuous exposure to moisture.
^b Specify Grade 2 for solid inner plies.
^c Where 1/16 inch or thicker faces are used, Grade 4 or better inner plies are permitted.

of defects, except that discolorations, sound knots, and small open defects, if securely patched or plugged with wood or wood filler will be permitted.

3.5.3. Regular grade—The wood strips shall be the same as sound grade, except that tightly butted end joints will be permitted.

3.5.4. Clear edge—The wood strips shall be "regular grade," except that the edge strips shall be 1½ inches or wider "clear grade" to permit shaping or molding.

3.5.5. Banded core—The bands shall be "clear grade." The species, width, number of bands, and grade between bands shall be as agreed upon between buyer and seller. The types of banding shall be as follows:

1. Banded one end (B1E)
2. Banded two ends (B2E)
3. Banded one side (B1S)
4. Banded two sides (B2S)
5. Banded two ends and one side (B2E1S)
6. Banded two sides and one end (B2S1E)

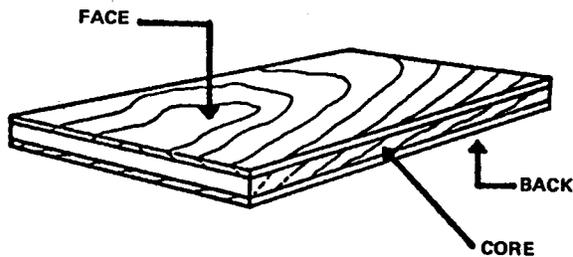
7. Banded two sides and two ends (B4)

3.6. Particleboard and hardboard cores—Particleboard cores shall be in accordance with Commercial Standard CS 236-66, *Mat-formed Wood Particleboard*.³ Hardboard cores shall be in accordance with Commercial Standard CS 251-63, *Hardboard*.³

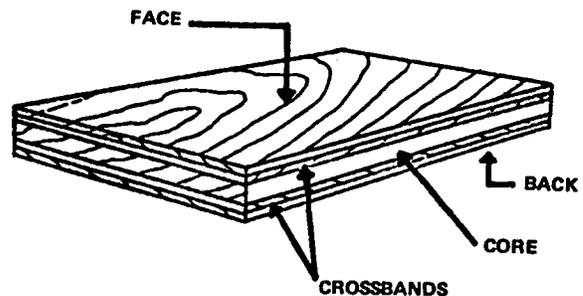
3.7. Special cores—Cores made of other material may be used providing all other applicable requirements of this Standard are met.

3.8. Construction—Plywood panels shall be constructed with an odd number of plies. All plies shall be combinations of species, thickness, and moisture content to produce a balanced panel. All inner plies, except the core or center ply, shall occur in pairs. Each pair of inner plies shall be of the same thickness and direction of grain. Each ply of each pair shall be placed on

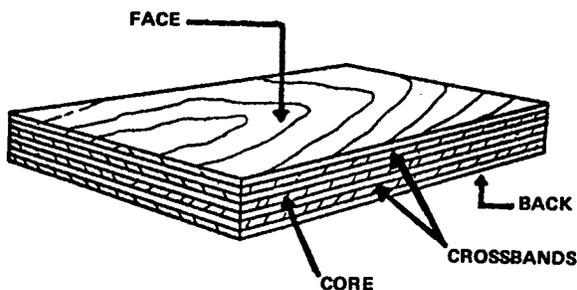
³ Later issues of this publication may be used providing the requirements are applicable and consistent with the issue designated. Copies are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.



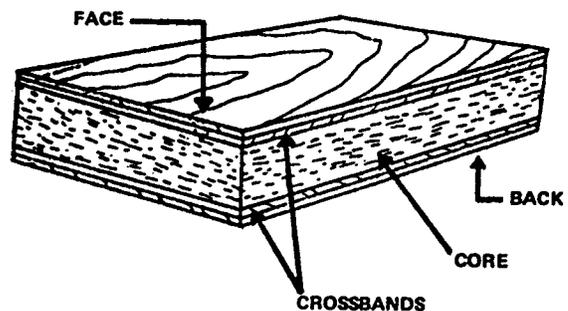
THREE-PLY VENEER CORE CONSTRUCTION



FIVE-PLY VENEER CORE CONSTRUCTION

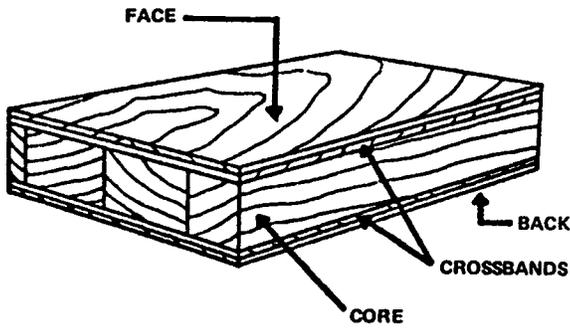


MULTIPLY VENEER CORE CONSTRUCTION

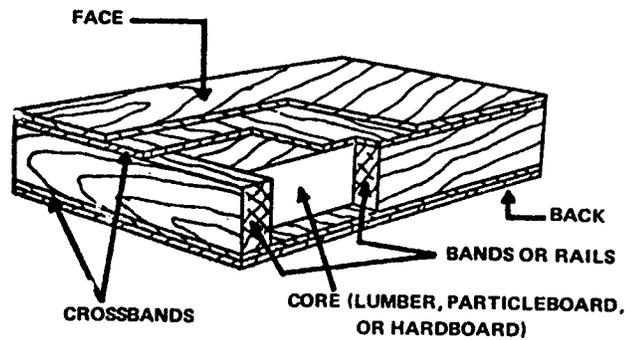


FIVE-PLY PARTICLEBOARD CORE CONSTRUCTION

FIGURE 2. Typical plywood constructions.



FIVE-PLY LUMBER CORE CONSTRUCTION



FIVE-PLY CONSTRUCTION WITH BANDING OR RAILING

FIGURE 2. Typical plywood constructions—continued.

opposite sides of the core. The grain of all plies shall be at right angles to the grain of the adjacent plies and to the ends or edges of the panel. Some typical constructions are illustrated in figure 2. The limiting criteria for plywood panels shall be as provided in table 5 except for container plywood which shall utilize grade 4 or better inner plies adjacent to the faces for each type. (See 3.14 for marking.)

3.8.1. Special construction—Because of special panel constructions and because of special face treatments, certain panels may deviate from a flat surface prior to their application. Such deviation shall not prevent their taking the shape of the surface to which they are applied without the development of defects attributable to this deviation.

3.9. Glue bond requirements—

3.9.1. Technical Type plywood — The glue bond of Technical Type plywood panels shall meet the wood failure requirements given in table 6 when tested in accordance with 4.2, 4.3, and 4.4. Technical Type plywood constructed with

TABLE 6. Wood failure requirements for Technical and Type I plywood glue bonds

Average failing load lb/sq in.	Minimum wood failure	
	Indiv. specimen Percent*	Test piece average Percent*
Under 250	25	50
250 to 350	10	30
Above 350	10	15

* These values are the percentage of wood area remaining adhered to the fractured surface in the test area.

hardwood face veneers on softwood inner plies shall also comply with the Exterior Type bond requirements specified in Voluntary Product Standard PS 1-66, *Softwood Plywood, Construction and Industrial*.⁴

⁴ See footnote 3, page 6.

3.9.2. Type I plywood — The glue bond of Type I plywood shall meet the same requirements as Technical Type.

3.9.3. Type II plywood—The glue bond of Type II plywood shall be of such quality that specimens shall withstand the 3-cycle soak test described in 4.2 and 4.5.

3.9.4. Type III plywood — The glue bond of Type III plywood shall be of such quality that specimens shall withstand the 2-cycle soak test described in 4.2 and 4.6.

3.10. Dimensions and tolerances—The nominal dimensions of the plywood panels shall be as agreed upon between buyer and seller. The tolerances for the nominal dimensions shall be as follows:

- Width: plus or minus 1/32 in
- Length: plus or minus 1/32 in
- Thickness:
 - Unsanded: plus or minus 1/32 in
 - Sanded: plus 0, minus 1/32 in except that a sanded tolerance of plus 0, minus 3/64 in will be permitted for panels having a nominal thickness of 1/4 in or more.

Note: One inch equals 2.54 centimeters.

3.10.1. Squareness—Panels 4 feet by 4 feet or larger shall be square within 3/32 inch. Panels less than 4 feet in length or width shall be square within 1/16 inch. Squareness shall be determined by measuring the length of the two diagonals of the panel.

3.10.2. Straightness—The edges of panels less than 8 feet long shall be such that a straight line from one corner to the adjacent corner shall fall within 1/16 inch of the panel edge. A departure of 3/32 inch will be permitted for panels 8 feet long and longer.

3.11. Sanding—The types of sanding shall be as described below. The type of sanding and the

number of surfaces of the panels to be sanded shall be as agreed upon between buyer and seller, except that in no case shall the plywood be considered as ready for finishing because raised grain due to moisture absorption and marks made in handling the plywood during shipment or storage may require further sanding.

No sanding—Surfaces need not be sanded nor tape removed.

Rough sanding—Sanding hit-or-miss. Tape removal is not required.

Regular sanding—Surfaces shall be clean and free of tape. Sander streaks are not considered defects.

Polish sanding—Surfaces shall be clean and smoothly sanded.

3.12. Moisture content—The moisture content of plywood panels at the time of shipment from the producing mill shall not exceed 12 percent of the oven-dry weight, as determined in accordance with 4.7.

3.13. Factory finished panels—The finish of factory finished panels shall be as agreed upon between buyer and seller.

3.14. Marking—All plywood represented as conforming to this Voluntary Product Standard shall be identified by either of the following methods:

(a) Each panel shall be marked with the symbol of this Standard, PS 51-71, the name or recognized identification of the producer; the species and grade of the face veneer; the type of plywood; the symbol "CP," if container plywood; and the identity of the qualified inspection and testing agency, if applicable (see section 7), or

(b) The shipment or order shall be accompanied by a written certification which states that the panels conform to all of the requirements of Voluntary Product Standard PS 51-71, and identifies the producer; the species and grade of the face veneer; the type of plywood; the qualified inspection and testing agency, if applicable (see section 7); and the specific intended use if container plywood.

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. Specimens for glue bond test—

4.2.1. Technical and Type I plywood—Three test pieces shall be cut from each panel selected: one piece from each end of the panel and one piece near the center of the panel. Each test piece shall be of sufficient size to provide at least six specimens for the dry shear test and six specimens for the cyclic-boil shear test (see table 7).

4.2.2. Type II plywood—A total of 10 test specimens shall be cut from each panel selected: two specimens from each end approximately at mid-width of the panel; two specimens from each edge approximately at mid-length of the panel; and two specimens near the center of the panel. Test specimens shall not have common edges (see table 7).

4.2.3. Type III plywood—Three test specimens shall be cut from each panel selected: one from each end of the panel and one near the center of the panel (see table 7).

TABLE 7. Test specimen sizes

Type of plywood	Specimen size
Technical & Type I	3¼ inch ^a by 1-inch specimens
Type II (3-cycle)	5-inch ^b by 2-inch specimens
Type III (2-cycle)	6-inch by 6-inch specimens

^a Parallel to the grain of the outside veneers in 3-, 7-, and 11-ply construction. Perpendicular to the grain of the outside veneers in 5- and 9-ply construction. The preceding applies to specimens for testing the innermost plies. Specimens for testing the outer plies shall always be parallel to the grain of the face veneer in the 3¼ inch dimension.

^b Parallel to the grain of the face veneers.

4.3. Dry shear test—Shear tests shall be conducted on specimens prepared as shown in figure 3. The ends of each specimen shall be gripped in test machine retaining jaws, and the load shall be applied at the rate of 600 to 1,000 pounds per minute. Specimen notching shall be accomplished in such a way as to assure that when the specimens are subjected to loading, the lathe checks in the center ply of half of the specimens will be in tension, while in the other half the lathe checks will be in compression. An explanation of one method of notching specimens to insure that half of the lathe checks are pulled in tension and half are pulled in compression, is described in American Society for Testing and Materials (ASTM) D 906-64, *Standard Method of Test for Strength Properties of Adhesives in Plywood Type Construction in Shear by Tension Loading*.⁵ If the number of plies exceeds three, the outer pairs of glue lines and innermost glue lines shall be tested with separate sets of test specimens. In plywood with face plies thicker than 1/16 inch, the shear area shall be 1 square inch, as shown in figure 3, specimen A. Specimens of plywood with face plies 1/16 inch

⁵ Later issues of this publication may be used providing the requirements are applicable and consistent with the issue designated. Copies of ASTM publications are obtainable from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

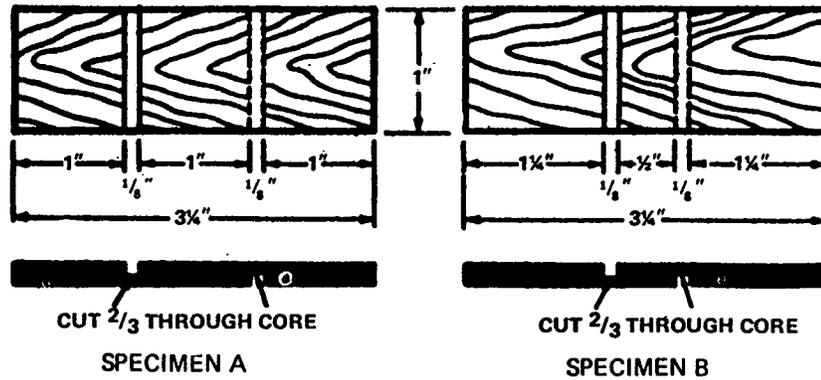


FIGURE 3. Plywood bond shear test specimens.

or less in thickness shall be of the form shown in figure 3, specimen B, in which the shear area shall be reduced to $\frac{1}{2}$ square inch without changing the width of the specimen. Test machine loads obtained from specimens of $\frac{1}{2}$ square inch shear area shall be multiplied by 2 to convert to pounds per square inch and then reduced by 10 percent before comparing with the required values set forth in table 6. For shear tests of lumber core plywood, particleboard core plywood, and hardboard core plywood, the core shall be cut away to $\frac{1}{10}$ inch in thickness.

4.4. Cyclic-boil shear test — The specimens prepared as shown in figure 3 shall be boiled in water for 4 hours and then dried for 20 hours at a temperature of 145 ± 5 °F (63 ± 3 °C). They shall be boiled again for 4 hours, cooled in water, and then subjected while wet to the test described in 4.3. The values obtained from the six specimens shall meet the applicable requirements given in table 6. If the number of plies exceeds three, the outer pairs of glue lines and innermost glue lines shall be tested with separate sets of test pieces.

4.5. Three-cycle soak test — The 5-inch by 2-inch specimens from each test panel shall be submerged in water at 75 ± 5 °F (24 ± 3 °C) for 4 hours and then dried at a temperature between 120 and 125 °F (49 to 52 °C) for 19 hours with sufficient air circulation to lower the moisture content (based on oven-dry weight) of specimens to a maximum of 8 percent. This cycle shall be repeated until all specimens fail or until three cycles have been completed, whichever occurs first. A specimen shall be considered as failing when any single delamination between two plies is greater than 2 inches in continuous length, over $\frac{1}{4}$ inch in depth at any point, and 0.003 inch in width, as determined by a feeler gage 0.003-inch thick and $\frac{1}{2}$ -inch wide. Delamination due to tape at joints of inner plies or defects permitted by the grade shall be disregarded. Nine of the 10 specimens shall pass the first cycle and

eight of the 10 specimens shall pass the third cycle.

4.6. Two-cycle soak test — The 6-inch by 6-inch specimens shall be submerged in water at 75 ± 5 °F (24 ± 3 °C) for 4 hours, and then dried at 75 ± 5 °F in an open room for 20 hours. The cycle shall be repeated until all specimens fail or until two cycles have been completed, whichever occurs first. A specimen shall be considered as failing when any single delamination between two plies is greater than 2 inches in continuous length, over $\frac{1}{4}$ inch in depth at any point and 0.003 inch in width. Separation is determined with a 0.003-inch feeler gage. When this test is applied to lumber core or particleboard core plywood, the core should be cut away to a depth of 1 inch on all four edges, leaving only enough core in this stress-relieved section to produce an approximate balance with the face ply. Delamination due to tape at joints of inner plies or defects permitted by the grade shall be disregarded. If there is a failure of more than one test specimen, the panel shall be classified as defective.

4.7. Moisture content test — The moisture content of the plywood shall be determined as follows: A small test specimen shall be cut from the sample panel; the test specimen shall measure not less than 9 square inches in area and shall weigh not less than 20 grams. All loose splinters shall be removed from the specimen. The specimen shall be immediately weighed to the nearest 0.1 of a gram, and the weight shall be recorded as the original weight. The specimen shall then be dried in an oven at 212 to 221 °F (100 to 105 °C) until constant weight is attained. After drying, the specimen shall be reweighed immediately, and this weight shall be recorded as the oven-dry weight. The moisture content shall be calculated as follows:

$$\frac{\text{Original weight} - \text{oven-dry weight}}{\text{Oven-dry weight}} \times 100 = \text{Moisture content (percent)}$$

5. DEFINITIONS

The terms used in this Voluntary Product Standard are defined as follows:

Back— The side reverse to the face of a panel, or the poorer side of a panel in any grade of plywood calling for a face and back.

Balanced panel— For purposes of this Standard, a balanced panel is one which is free from warp that affects serviceability for its intended use.

Banding— Portion of wood extending around one or more sides of plywood panels.

Bark pocket— Comparatively small area of bark around which normal wood has grown.

Brashness— Condition of wood characterized by low resistance to shock and by abrupt failure across the grain without splintering.

Burl— A swirl or twist in the grain of the wood which usually occurs near a knot or crotch but does not contain a knot.

Checks— Small splits running parallel to grain of wood, caused chiefly by strains produced in seasoning.

Comb grain— Rift cut oak veneer with straight grain figure (see "Quartered").

Core— Also referred to as "center." The innermost portion of plywood, usually veneer; however, it may be of sawed lumber, either one piece or several pieces joined and glued, or it may be particleboard, hardboard, or of some other material.

Core, banded— Core that has been made with banding on one or more sides.

Crossbar— Type of figure or irregularity of grain resembling a dip in the grain running at right angles, or nearly so, to the length of the veneer.

Crossbanding— Veneer used in the construction of plywood with five or more plies. In five-ply construction, it is placed at right angles to the grain of the core and faces.

Cross break— Separation of the wood cells across the grain. Such breaks may be due to internal strains resulting from unequal longitudinal shrinkage or to external forces.

Decay— The decomposition of wood substance by fungi. The incipient stage is characterized by discoloration, and may be accompanied by a softening of the wood substance. The final or ultimate state is characterized by the partial or complete collapse of the wood structure and the destruction of the wood substance.

Defects, open— Checks, splits, open joints, knotholes, cracks, loose knots, wormholes, gaps, voids, or other openings interrupting the smooth continuity of the wood surface.

Delamination— Separation of plies or layers of wood or other material through failure of the adhesive bond.

Discolorations— Stains in wood substances. Common veneer stains are sap stains, blue stains, stain produced by chemical action caused by the iron in the cutting knife coming in contact with the tannic acid of the wood, and those resulting from the chemical action of the glue.

Doze— (Synonymous with dote) A form of incipient decay characterized by a dull and lifeless appearance of the wood, accompanied by a lack of strength and softening of the wood substance.

Face— The better side of any plywood panel in which the outer plies are of different veneer grades. Also either side of a panel in which there is no difference in the veneer grade of the outer plies.

Figure— The pattern produced in a wood surface by annual growth rings, rays, knots, deviations from natural grain such as interlocked and wavy grain, and irregular coloration.

Finger joint— A series of fingers machined on the ends of two pieces of wood to be joined, which mesh

together and are held firmly in position with an adhesive.

Flat grain— Veneer cut so that the growth rings on more than half of the width of the piece make an angle of less than 45° with the surface. Also called "plain cut," "flat sawed," or "slash grain."

Gap— Open slits in the inner plies or improperly joined veneers.

Grain— The direction, size, arrangement, and appearance of the fibers in wood or veneer.

Grain rupture— Veneer with slight breaks from improper cutting or irregular grain.

Gum pockets— Well-defined openings between rings of annual growth, containing gum or evidence of prior gum accumulations.

Gum spots— Gum or resinous material or color spots caused by prior resin accumulations sometimes found on panel surfaces. Gum spots can often be removed by sanding.

Hairline— Thin, perceptible line showing at the joint of two pieces of wood.

Half-round— Veneer produced in the same manner as rotary cutting, except that the piece being cut is secured to a "stay log," a device that permits the cutting of the log on a wider sweep than when mounted with its center secured in the lathe.

Hardboard— A generic term for a flat homogeneous panel manufactured primarily from inter-felted lignocellulosic fibers consolidated under heat and pressure to a density of 31 lb/cu. ft. or more.

Hardwood— General term used to designate lumber or veneer produced from broad-leaved or deciduous trees in contrast to softwood, which is produced from evergreen or coniferous trees.

Heartwood— The nonactive center of a tree generally distinguishable from the outer portion (sapwood) by its darker color.

Holes, worm— Holes resulting from infestation of worms.

Joint— The line between the edges or ends of two adjacent sheets of veneer or strips of lumber in the same plane.

Joint, edge— Joint running parallel to the grain of the wood.

Joint, open— Joint in which two adjacent pieces of veneer do not fit tightly together.

Knot— Cross section of tree branch or limb with grain usually running at right angles to that of the piece of wood in which it occurs.

Knot, open— Opening produced when a portion of the wood substance of a knot has dropped out, or where cross checks have occurred to produce an opening.

Knotholes— Openings produced when knots drop from the wood in which they were originally embedded.

Knots, pin— Sound knots less than ¼ inch in diameter.

Knots, sound, tight— Knots that are solid across their face and fixed by growth to retrain their place.

Lap— A condition where one piece of veneer in the same ply overlaps an adjacent piece.

Loose side— In knife-cut veneer, that side of the sheet that was in contact with the knife as the sheet was being cut, and containing cutting checks (lathe checks) because of the bending of the wood at the knife edge.

Mismatched plywood— A panel having the face made up of specially selected dissimilar (in color and grain) veneer strips of the same species and generally V-grooved at the joints between strips to simulate lumber planking.

Particleboard— A panel composed of small chips or pieces of wood that are bonded together in the presence of heat and pressure by a synthetic resin adhesive.

Patches — Insertions of filler material or sound wood plugs or shims placed and glued into veneers or panels from which defective portions have been removed.

Plain sliced — Veneer sliced parallel to the pith of the log and approximately tangent to the growth rings. Also termed "Flat cut."

Ply — A single sheet of veneer, or several pieces laid with adjoining edges, which form one layer in a piece of plywood. Also, when two or more full sized sheets of veneer are combined in thickness so that the grain of each sheet is in the same direction.

Plywood, hardwood — A panel composed of an assembly of layers or plies of veneer (or veneers in combination with lumber core, particleboard core, hardboard core, or of special core material) joined with an adhesive. Except for special constructions, the grain of alternate plies is always approximately at right angles, and the face veneer is usually a hardwood species.

Quartered — Veneer produced by slicing or sawing a log to bring out certain figures called medullary or pith rays, which are especially conspicuous in oak. The log is fitched in several different ways to allow the cutting of the veneer in a radial direction.

Rift cut — Method of cutting veneer perpendicular to the medullary rays.

Rotary cut — Veneer produced by centering the entire log in a lathe and turning it against a broad cutting knife which is set into the log at a slight angle.

Rough cut — Irregular shaped areas of generally uneven corrugation on the surface of veneer, differing from the surrounding smooth veneer and occurring as the veneer is cut by the lathe or slicer.

Sapwood — The living wood of lighter color occurring in the outer portion of a tree. Sometimes referred to as "sap."

Shake — A separation along the grain of wood in which the greater part occurs between the rings of annual growth.

Sharp contrasts — For purposes of this Standard, this term means that face veneer of lighter than average color should not be joined at the edges with veneer of darker than average color and that two adjacent pieces of veneer should not be widely dissimilar in grain, figure, and other natural character markings.

Sliced — Veneer produced by thrusting a log or sawed fitch into a slicing machine which shears off the veneer in sheets.

Smooth, tight cut — Veneer carefully cut to minimize lathe checks.

Softwood — General term used to describe lumber or veneer produced from needle and/or cone bearing trees. (See "Hardwood.")

Solid core — Plywood panels in which the inner plies are free from voids.

Species — A distinct kind of wood.

Specific gravity — The ratio of the weight of a certain volume of a substance to the weight of an equal volume of water, the temperature of which is 39.2 °F (4 °C.)

Splits — Separations of wood fiber running parallel to the grain.

Streaks, mineral — Natural discolorations of the wood substance.

Tape — Strips of gummed paper or cloth sometimes placed across the grain of large veneer sheets to facilitate handling and sometimes used to hold the edges of veneer together at the joint prior to gluing.

Tight side — In knife-cut veneer, that side of the sheet that was farthest from the knife as the sheet was being cut and containing no cutting checks (lathe checks).

Veneer — A thin sheet of wood, rotary cut, sliced, or sawed from a log, bolt, or fitch. Veneer may be

referred to as a ply when assembled into a panel.

V-grooved — Narrow and shallow V- or U-shaped channels machined on the plywood face to achieve a decorative effect. V-grooving is most commonly encountered in mismatched wall panels as the grooves fall on the edge joints of the pieces of veneer making the face appear as planking.

Wood failure (percentage) — The area of wood fiber adhering at the glue line following completion of the specified shear test. Determination is by visual examination and the value is expressed as an estimated percentage of the wood area remaining adhered to the fractured surface in the test area.

Wood filler — An aggregate of resin and strands, sheards, or flour of wood which is used to fill openings in wood and provide a smooth, durable surface.

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 plywood conforms to all of the requirements established in Voluntary Product Standard PS 51-71, 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 51-71, (name and address of producer or distributor).

7. QUALIFIED INSPECTION AND TESTING AGENCY

A qualified inspection and testing agency is defined to be one that:

- (a) has the facilities and trained technical personnel to verify that the grading, measuring, species, construction, sanding, bonding, 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 single company manufacturing the product being inspected or tested; and,
- (d) is not owned, operated, or controlled by any such company.

8. 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 August 15, 1971.

9. HISTORY OF PROJECT

Commercial Standard CS 35-61, *Hardwood Plywood*, was developed at the request of the Hardwood Plywood Manufacturers Association and was published in 1961.

In 1965, the Hardwood Plywood Manufacturers Association requested that the Bureau of Standards initiate a revision of CS 35-61 under the *Procedures for the Development of Voluntary Product Standards*. A proposed revision was approved by the Standing Committee in November 1970. The recommended revision was then circulated for acceptance in February 1971. The responses to this circulation indicated a consensus among the producers, distributors, and users, in accordance with the published procedures.

The new edition of the Standard was designated Voluntary Product Standard PS 51-71, *Hardwood and Decorative Plywood*, and became effective on August 15, 1971.

10. 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

- Christensen, Donald E., (Chairman), Hardwood Products Division, Weyerhaeuser Company, Tacoma, Washington 98401
Black, Lynn, Georgia-Pacific Corporation, P.O. Box 789, Eugene, Oregon 97401
Kornegay, W. D., Jr., Calypso Plywood Company, Inc., P.O. Box 188, Calypso, North Carolina 28325
Pratt, James W., Roseburg Lumber Company, P.O. Box 1088, Roseburg, Oregon 97470
Taylor, A. R., A. R. Taylor Veneer Company, Inc., P.O. Box 719, Demopolis, Alabama 36732

Representing Distributors

- Davidson, Ralph P., Houston Sash and Door Company, P.O. Box 126, Houston, Texas 77001
Davis, Don L., Jr., Aetna Plywood and Veneer Company, 1731 Elston Avenue, Chicago, Illinois 60622
Harrell, Raymon H., National Lumber and Building Material Dealers Association, 18th and M Streets, N.W., Washington, D.C. 20036
Pugh, Norman R., Merchandise Development and Testing Laboratories, Sears, Roebuck & Company, 925 South Homan Avenue, Chicago, Illinois 60607

Representing Users

- Sanderford, Vincent, Research and Development Department, Drexel Enterprises, Drexel, North Carolina 28619
Shoemaker, John W., National Woodwork Manufacturers Association, 400 West Madison Street, Chicago, Illinois 60606
Smithman, Milton W., Technical Services, National Association of Home Builders, 1625 L Street, N.W., Washington, D.C. 20036
Vaughn, Norman L., L. Vaughn Company, 555 Jefferson Boulevard, Warwick, Rhode Island 02886

Representing Consumers and General Interest

- Edmonson, Glenwood M., Architectural and Engineering Division, Federal Housing Administration, Department of Housing and Urban Development, Washington, D.C. 20410
Robinson, Lawrence R., Jr., Department of General Services, Sacramento, California 95814
Schnell, Donald E., AIA, 505 South Third Street, Louisville, Kentucky 40202
Schwaner, Robert M., General Services Administration, Federal Supply Service, Standardization Division, Washington, D.C. 20406
Sliker, Dr. Alan, Department of Forest Products, Michigan State University, East Lansing, Michigan 48910
Smith, Russell W., Jr., Building Research Division, National Bureau of Standards, U.S. Department of Commerce, Washington, D.C. 20234

11. 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

- American Institute of Architects, Montana Chapter, Billings, Mont.
American Institute of Timber Construction, Englewood, Colo.
American Plywood Association, Tacoma, Wash.
American Specification Institute, Chicago, Ill.
American Walnut Manufacturers' Association, Chicago, Ill.
Building Officials and Code Administrators Institute, Chicago, Ill.
California Redwood Association, San Francisco, Calif.
Fine Hardwoods Association, Chicago, Ill.
International Conference of Building Officials, Pasadena, Calif.

National Builders' Hardware Association, New York, N.Y.
 National Building Material Distributors Association, Chicago, Ill.
 National Forest Products Association, Washington, D.C.
 National Lumber and Building Material Dealers Association, Washington, D.C.
 National Particleboard Association, Silver Spring, Md.
 National Sash and Door Jobbers Association, Chicago, Ill.
 National Woodwork Manufacturers Association, Chicago, Ill.
 Southern Forest Products Association, New Orleans, La.
 Western Wood Products Association, Portland, Ore.
 Woodwork Institute of California, Fresno, Calif.

PRODUCERS

All-Wood, Inc., Bayfield, Wis.
 American International Hardwood Company, New York, N.Y.
 Ashby Veneer & Lumber Company, Jackson, Tenn.
 AVM Corporation, Jamestown Plywood Division, Jamestown, N.Y.
 Bennett Cabinets, Edison, N.J.
 Birchwood of Los Angeles, Inc., Los Angeles, Calif.
 Boise Cascade Decorative Hardwood Paneling, Danville, Va.
 Bradford Veneer & Panel Company, Inc., Bradford, Vt.
 Bradley Plywood Corporation, Savannah, Ga.
 Bruce, E. L., Company of Texas, Center, Tex.
 Calypso Plywood Company, Inc., Calypso, N.C.
 Carolina Veneer & Plywood Company, Florence, S.C.
 Center Plywood Company, Center, Tex.
 Chicago Mill & Lumber Company, Greenville, Miss.
 Churchill Cabinet Company, Chicago, Ill.
 Columbia Plywood Corporation, Portland, Ore.
 Commonwealth Plywood Company Ltd., Ste. Therese, Quebec, Canada
 Cummings, E. M., Veneers, Inc., New Albany, Ind.
 Darlington Veneer Company, Inc., Darlington, S.C.
 Davis Wood Products, Inc., Hudson, N.C.
 Day Companies, Inc., Memphis, Tenn.
 Denmark Veneer Company, Denmark, S.C.
 Doxey Plywood Corporation, Fayetteville, N.C.
 Dunbar Furniture Corporation, Berne, Ind.
 Eggers Plywood Company, Two Rivers, Wis.
 General Box Company, De Quincy, La.
 Georgia-Pacific Corporation, Portland, Ore.
 Great Southern Wirebound Box Company, Magnolia, Miss.
 Hoosier Panel Company Inc., The, New Albany, Ind.
 Horner Veneer Corporation, New Bern, N.C.
 Idaho Veneer Company, Post Falls, Idaho
 Imperial Finishing Corporation, Elkhart, Ind.
 Interstate Veneer Company, Inc., Emporia, Va.
 Iron Wood Products Corporation, Bessemer, Mich.
 Jasper Stylemasters, Inc., Jasper, Ind.
 Kearsse Manufacturing Company, Olar, S.C.
 King Veneer Company, Inc., Florence, S.C.
 Larson Plywood Company, Inc., Sheboygan, Wis.
 Lea Lumber & Plywood Company, Division Lea Industries, Windsor, N.C.
 Lorenz Lumber Company, Division of Fibreboard Corporation, Burney, Calif.
 Marion Plywood Corporation, Marion, Wis.
 McKnight Veneer & Plywoods, Inc., West Helena, Ark.
 Memphis Plywood Corporation, Memphis, Tenn.
 Meridian Plywood, Inc., Meridian, Miss.
 Midhattan Woodworking Corporation, Old Bridge, N.J.
 Nickey Brothers, Inc., Memphis, Tenn.
 Panoply Corporation, Lexington, Tenn.
 Pavco Industries, Inc., Pascagoula, Miss.
 Pilot Woodworking Company, Inc., Carlstadt, N.J.
 Ply-Curves, Inc., Grand Rapids, Mich.
 Plywood Manufacturers, Cheraw, S.C.

Plywood Panels, Inc., New Orleans, La.
 Powe Veneer Company, Inc., Camden, S.C.
 Precision-Built Corporation, Cincinnati, Ohio
 Publishers Paper Company, Dwyer Division, Portland, Ore.
 Quimby, Allen, Veneer Company, Scoville Manufacturing Company, Pingham, Maine
 Roseburg Lumber Company, Roseburg, Ore.
 Rutland Plywood Corporation, Rutland, Vt.
 Sanders Manufacturing Company, Gainesville, Tex.
 Sogefor Limitee, Maki Division, Maniwaki, Quebec, Canada
 Southern Laminating Company, Memphis, Tenn.
 Standard Plywoods, Inc., Clinton, S.C.
 States Veneer Inc., Eugene, Ore.
 Statesville Plywood & Veneer Company, Statesville, N.C.
 Stover Plywood Corporation, Princeton, N.J.
 Taylor, A. R., Veneer Company, Demopolis, Ala.
 Taylor-Jamestown Corporation, Jamestown, N.Y.
 Thomason Industries, Inc., Fayetteville, N.C.
 Union Camp Corporation, Wayne, N.J.
 U.S. Plywood-Champlon Papers, Inc., New York, N.Y.
 Vanply, Inc., Charlotte, N.C.
 Weber Veneer & Plywood Corporation, Shawano, Wis.
 Weyerhaeuser Company, Tacoma, Wash.
 Williamson Veneer Company, New Freedom, Pa.
 Wisconsin Laminates, Inc., Pewaukee, Wis.
 Wisconsin Timber & Land Company, Inc., Mattoon, Wis.
 Yonkers Plywood Manufacturing Corporation, Old Bridge, N.J.

DISTRIBUTORS

Aetna Plywood & Veneer Company, Chicago, Ill.
 Boise Cascade Corporation Timber and Building Products, Boise, Idaho
 California Panel & Veneer Company, Los Angeles, Calif.
 Columbia International, Portland, Ore.
 ComTex Industries, Inc., Miami, Fla.
 Dogwood Sales Company, Portland, Ore.
 Downes Lumber Company, Boston, Mass.
 Ehrlich-Harrison Company, Seattle, Wash.
 Evans Product Company, Corona, Calif.
 Frost Hardwood Lumber Company, San Diego, Calif.
 Goodrich Forest Products, Inc., Portland, Ore.
 Groffman, Louis C., St. Louis, Mo.
 Hill, Ray, Lumber Company, Los Angeles, Calif.
 Houston Sash and Door Company, Houston, Tex.
 International Paper Company, Long-Bell Division, Longview, Wash.
 Miller Manufacturing Company, Inc., Richmond, Va.
 Osgood, Robert S., Inc.—Lumber & Veneers, Los Angeles, Calif.
 Pease Company, Hamilton, Ohio
 Pivnick, Ben, Plywood & Veneer Company, Farmington, Mich.
 Prinsho Products, Inc., Valdosta, Ga.
 Seidelmann, Ernst, Corporation, New York, N.Y.
 Southwest Plywood Corporation, Compton, Calif.
 Thompson, Ted, Sales Company, Grand Rapids, Mich.
 Tulane Hardwood Lumber Company, Inc., New Orleans, La.
 Twin City Hardwood Lumber Company, St. Paul, Minn.
 Webber Lumber & Supply Company, Fitchburg, Mass.
 Webster Lumber Mills, Inc., Seattle, Wash.

USERS

American Panel Products, Ypsilanti, Mich.
 Balco Drafting and Construction Company, Bayonne, N.J.
 Bank Building Corporation, St. Louis, Mo.
 Barnes, Hilgers & Maslen, A.I.A., Portland, Ore.
 Baron, G. S., Architect, Louisville, Ky.
 Boese, Olin, and Associates, Architects, Fort Worth, Tex.

Bolick, Allen J., & Associates, Hickory, N.C.
 Bornstein, Ale, Inc., Louisville, Ky.
 Brandow & Johnston Associates, Los Angeles, Calif.
 Brust & Brust, Inc., Architects, Engineers, Planners,
 Milwaukee, Wis.
 Camlet, J. Thomas, & Sons, Architects and Engineers,
 Clifton, N.J.
 Capesius, V. M., Civil Engineer, San Diego, Calif.
 Carpenter, W. J., Company, Inc., Brightwood, Va.
 Childs Designs, Terre Haute, Ind.
 Clayton, George E., & Associates, Architects, Grand
 Island, Nebr.
 Crawford Furniture Manufacturing Corporation,
 Jamestown, N.Y.
 Cunningham-Limp Company, Atlanta, Ga.
 Curtis and Davis, Architects and Planners, Inc., New
 Orleans, La.
 Denning Mills Company, Richmond, Calif.
 Dimond, Grover, Associates, Inc., St. Paul, Minn.
 Eddy & Paynter Associates, A.I.A. Architects,
 Bakersfield, Calif.
 Flannagan, Eric G., and Sons, Architects and Engineers,
 Henderson, N.C.
 Fox, Ballas, Barrow, Architects, Missoula, Mont.
 Gamble Brothers, Inc., Louisville, Ky.
 Gresham, E. T., Company, Inc., Norfolk, Va.
 Hansen, Carl C., Consulting Engineer, Silver Spring, Md.
 Hartstern, Schnell, Campbell, Schadt, Associates,
 Louisville, Ky.
 Haver, Nunn & Nelson, Architects, Phoenix, Ariz.
 Herbst-Jacoby & Jacoby, Inc., Milwaukee, Wis.
 Hermsdorf Fixture Company, Manchester, N.H.
 Hess, Gillis & Vigesaa, Architects, Great Falls, Mont.
 Holdstein, Milo S., A.I.A., Architect, Cleveland, Ohio
 Home, Inc., St. Paul, Minn.
 Hope, Frank L., & Associates, San Diego, Calif.
 Kemp, Bunch & Jackson, Architects, Jacksonville, Fla.
 Kestle, Charles A., A.I.A. & Associates, Butte, Mont.
 Manson, Jackson and Kane, Architects, Lansing, Mich.
 Marquard Sash & Door Manufacturing Company, The,
 Cleveland, Ohio
 Marshfield Homes, Marshfield, Wis.
 Mastny Associates, Inc., Minnetonka, Minn.
 McCoy, Ernest L., Architect A.I.A., Bakersfield, Calif.
 Metamora Woodworking Company, Metamora, Ill.
 Met-L-Wood Corporation, Chicago, Ill.
 Morse, David L., Architect, Newton Centre, Mass.
 Parish, Merwin & Parish, Architects, St. Petersburg, Fla.
 Portsmouth Lumber Corporation, Portsmouth, Va.
 Rader, Paul W., Architect, Lakewood, Colo.
 RCA, Camden, N.J.
 Reich, H. H., Consulting Engineers, Inc., Pittsburgh, Pa.
 Schwarz & Henmi, St. Louis, Mo.
 Seattle Door Company, Inc., Kirkland, Wash.
 Smith, Hinchman & Grylls, Detroit, Mich.
 Somerset Wood Products Company, Somerville, N.J.
 Stephan, W. G., Structural Engineer, Miami, Fla.
 Sterlingworth Corporation, Jamestown, N.Y.
 Sverdrup & Parcel and Associates, Inc., St. Louis, Mo.
 Swift Industries, Inc., Pittsburgh, Pa.
 Walker & Walker, Architects, Shreveport, La.
 Walton, Conrad G., A.I.A., CSI, Houston, Tex.
 Washington Woodworking Company, Inc., Landover, Md.
 Western Electric Company, Inc., New York, N.Y.
 Wilber, Kendrick, Workman & Warren, Architects and
 Engineers, Charlotte, N.C.
 Williams & Stippich, Consulting Engineers, Wichita,
 Kans.
 Williamson, Thomas W., & Associates, Architects,
 Topeka, Kans.

Birchwood Manufacturing Company, Rice Lake, Wis.
 Borden, Inc., Borden Chemical Division, Springfield,
 Oreg.
 Cincinnati Milacron, Inc., Cincinnati, Ohio
 Columbus Roof Trusses, Inc., Columbus, Ohio
 Durham, Anderson, Freed Company, Architects, Seattle,
 Wash.
 Elmendorf Research, Inc., Palo Alto, Calif.
 Ewing, Miller Partnerships, Architects, Planners,
 Engineers, Terre Haute, Ind.
 Fuller, H. B., Company, St. Paul, Minn.
 Georgia Electrification Council, Athens, Ga.
 GFDS Engineers, San Francisco, Calif.
 Gulf Adhesives, Lansdale, Pa.
 Gunderson, Inc., Portland, Oreg.
 Hirzel, Charles K., A.I.A., Architect, New York, N.Y.
 Insular Lumber Sales Corporation, Philadelphia, Pa.
 Langdale Company, The, Valdosta, Ga.
 Levi, Solomon, Consulting Engineer, Brooklyn, N.Y.
 Macy, R. H., & Company, Inc., New York, N.Y.
 Massachusetts, University of, Wood Science and
 Technology, Amherst, Mass.
 Monsanto Company, Eugene, Oreg.
 National Casein Company, Chicago, Ill.
 National Starch & Chemical Corporation, Plainfield, N.J.
 Northern Arizona University, School of Forestry,
 Flagstaff, Ariz.
 Pacific Resins & Chemicals, Inc., Seattle, Wash.
 Pease, L. V., Ltd., San Francisco, Calif.
 Pittsburgh Testing Laboratory, Pittsburgh, Pa.
 Plywood Fabricator Service, Inc., Tacoma, Wash.
 PPG Industries, Inc., Adhesive Products, Bloomfield, N.J.
 Prentice, E. V., Company, Portland, Oreg.
 Reichhold Chemicals, Inc., Tacoma, Wash.
 Reynolds, Smith & Hills, Architects, Engineers, Planners,
 Inc., Jacksonville, Fla.
 Ron, C. M., Forest Products Services, Inc., Mobile, Ala.
 Sauer, Marr, Grimes, Wood, Consulting Structural
 Engineers, Sacramento, Calif.
 Scherrer-Bauman and Associates, Santa Ana, Calif.
 Sears, Roebuck and Company, Chicago, Ill.
 Texas Forest Service, Texas Forest Products
 Laboratory, Lufkin, Tex.
 United States Testing Company, Hoboken, N.J.
 Virginia Polytechnic Institute and State University,
 Blacksburg, Va.
 Wank, Adams, Slavin & Associates, New York, N.Y.
 Wright-Gilfillen-Keske, Inc., Columbus, Ohio
 Yoder Design Service, Kalona, Iowa

FEDERAL, STATE, AND LOCAL GOVERNMENTS

Agriculture, U.S. Department of, Agriculture Research
 Service, Agriculture Engineering Research Division,
 Beltsville, Md.
 Agriculture, U.S. Department of, Forest Service, North-
 eastern Forest Experiment Station, Forest Product
 Marketing Laboratory, Princeton, W.Va.
 Agriculture, U.S. Department of, Office of Plant and
 Operations, Washington, D.C.
 Air Force, Department of the, Air Force Packaging
 Evaluation Agency, Dayton, Ohio
 Army, Department of the, Office of the Chief of
 Engineers, Washington, D.C.
 Army, Department of the, U.S. Natick Laboratories,
 Packaging Division, Natick, Mass.
 California, State of, Department of General Services,
 State Building Standards Commission, Office of
 Architecture and Construction, Sacramento, Calif.
 District of Columbia, Department of General Services,
 Bureau of Procurement, Washington, D.C.
 General Services Administration, Federal Supply
 Service, Washington, D.C.

GENERAL INTEREST

Atkins, Kroll & Company, Ltd., San Francisco, Calif.
 Bergemann, Vanek & Associates, Architects, Canton,
 Ohio

Hawaii, State of, Department of Accounting and General Services, Purchasing and Supply Division, Honolulu, Hawaii
 Health, Education, and Welfare, Department of, Division of Procurement and Material, Washington, D.C.
 Housing and Urban Development, Department of, Federal Housing Administration, Office of Technical and Credit Standards, Washington, D.C.
 Interior, Department of the, Bureau of Indian Affairs, Division of Plant Design and Construction, Albuquerque, N.Mex.
 Interior, Department of the, U.S. Bureau of Reclamation, Division of Design, Denver, Colo.
 Lakewood, City of, Office of Assistant Building Commissioner, Lakewood, Ohio
 Memphis, City of, Board of Education, Memphis, Tenn.
 Navy, Department of the, Naval Facilities Engineering Command, Standardization and Technical Data Branch, Washington, D.C.
 New York, State of, Office of General Services, Division of Purchase, Albany, N.Y.
 Pennsylvania, Commonwealth of, Bureau of Standards, Harrisburg, Pa.
 U.S. Postal Service, Facilities Department, Office of Procurement, Washington, D.C.

APPENDIX

A 1. Reinspection practices — The following, based on general industry practices, is offered only for the information of purchasers of hardwood and decorative plywood. This information does not affect the requirements of this Voluntary Product Standard or take precedence over purchasing agreements.

All complaints regarding the quality of any shipment should be made within 15 days from receipt thereof.

If the grade of any shipment is in dispute and

a reinspection is requested, the cost of such inspection should be borne by the seller if the shipment is more than 5 percent below grade. The buyer need not accept those panels established as a result of reinspection as being below grade, but should accept the balance of the shipment as invoiced.

If the reinspection establishes that the shipment is 5 percent or less below grade, the buyer should pay for the shipment as invoiced as well as the cost of the reinspection.

A 2. Method of ordering — The recommended procedure for ordering hardwood and decorative plywood is to list the following:

- (1) Number of panels
- (2) Type of plywood
- (3) Number of plies
- (4) Thickness of face veneer and of panels
- (5) Width (across the grain)
- (6) Length (with the grain)
- (7) Species of face ply and whether light, medium, or dark color
- (8) Grade of face ply and matching requirements
- (9) Grade of back ply
- (10) Grade of lumber core and type of banding (if required)
- (11) Type, grade, and class of particleboard core (if required)
- (12) Type of hardboard core (if required)
- (13) Type of special core (if required)
- (14) Sanding requirements
- (15) Solid core (if required)
- (16) Density group of inner plies

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance of a Voluntary Product Standard and its significance:

1. *Enforcement*—Voluntary Product Standards contain requirements which are established by mutual consent of those concerned in accordance with the *Procedures for the Development of Voluntary Product Standards* published by the Department of Commerce (15 CFR Part 10, as amended, May 28, 1970). The standards provide a common basis of understanding among producers, distributors, and users or consumers. The National Bureau of Standards has *no* regulatory power in the enforcement of the provisions of voluntary standards, but since these standards represent the will of the interested groups as a whole, their provisions soon become established as trade customs and become effective when the standards are referenced in sales contracts, procurement specifications, government regulations, and the like.

2. *The Responsibility of the Acceptor*—The purpose of Voluntary Product Standards is to establish, for specific items, nationally recognized sizes, grades, material requirements, or performance criteria. The benefits that result from these standards will be in direct proportion to general recognition and actual use of the standards. Instances will occur when it may be necessary to deviate from a standard. The signing of an acceptance does not preclude such departures. The acceptor's signature, however, indicates an intention to follow the standard, where practicable, in the production, distribution, or use and consumption of the product in question.

WITHDRAWN

ACCEPTANCE OF VOLUNTARY PRODUCT STANDARD

PS 51-71, HARDWOOD AND DECORATIVE PLYWOOD

This form properly completed, signed, and returned will show your acceptance of this *Voluntary Product Standard*.

Date _____

Office of Engineering Standards Services
National Bureau of Standards
U.S. Department of Commerce
Washington, D.C. 20234

Gentlemen:

We are primarily engaged in the following segment of the industry:

(Please check only one.)

- | | |
|---------------------------------------|---|
| <input type="checkbox"/> Production | <input type="checkbox"/> Use/consumption |
| <input type="checkbox"/> Distribution | <input type="checkbox"/> General Interest |

We believe that this *Voluntary Product Standard* constitutes a useful standard of practice, and we plan to use it as far as practicable. *However*, we reserve the right to depart from the standard as we deem advisable.

We understand, of course, that only those products which actually conform to the standard in all respects may be represented as conforming thereto.

Signature of authorized officer _____

(Please type or print the following)

Name and title of above officer _____

Organization _____

(Fill in exactly as it should be listed.)

Street Address _____

City, State, and ZIP Code _____

(Note: Separate acceptances should be filed for each subsidiary company and affiliate which is to be listed as an acceptor.)

(Cut on this line)

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