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MILITARY SPECIFICATION

PLYWOOD AND VENEER AIRCRAFT FLAT PANEL

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers aircraft flat panel plywood and veneer.

1.2 Classification. Aircraft plywood shall be furnished in one grade only in the species and of the panel construction as selected from Tables I, II and III.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specification, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

Federal

QQ-S-781	Steel, Strapping, Flat
MMM-A-181	Adhesive, Room Temperature and Intermediate-Temperature Setting Resin (Phenol, Resorcinol, and Melamine Base)

STANDARDS

Federal

FED-STD-175	Adhesives, Methods of Testing

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage

(Copies of specification, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: HQ CASC/CBEBT, 74 N. Washington Ave., Battle Creek, MI 49017-3094, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426 appearing at the end of this document or by letter.

FSC 5530

AMSC N/A

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated the issue in effect on date of invitation for bids or request for proposal shall apply.

National Bureau of Standards Publications

Product Standard PS 1-83 - Construction and Industrial Plywood

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington D.C. 20402.)

American Society for Testing and Materials

ASTM D 2395 - Specific Gravity of Wood-Based Materials
ASTM D 906 - Test Methods for Strength Properties of Adhesives in Plywood Type Construction in Shear by Tension Loading
ASTM D 1151 - Test Method for Effect of Moisture and Temperature on Adhesive Bonds

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia PA 19103.)

American Trucking Associations, Inc.

National Motor Freight Classification Rules

(Application for copies should be addressed to the American Trucking Associations, Inc., 1616 P. Street, N.W., Washington DC 20036.)

Uniform Classification Committee

Uniform Freight Classification Rules

(Application for copies should be addressed to the Uniform Classification Committee, 202 Union Station, 516 W. Jackson Blvd, Chicago IL 60606.)

Technical society and technical association specifications and standards are generally available for references from libraries. They are also distributed among technical groups and using Federal Agencies.

2.3 Order of Precedence. In the event of a conflict between the text of this specification and the reference cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Species of wood. The species of wood given by Table I and as specified (see 6.2) in the contract shall be used in aircraft flat panel plywood construction.

TABLE I
Species of Wood

Group I (High Density)		Group II (Medium Density)		Group III (Low Density)	
Species	Minimum Specific Gravity (1)	Species	Minimum Specific Gravity (1)	Species	Minimum Specific Gravity (1)
American Beech	0.60	Birch (Alaska and Paper)	0.53	Basswood	0.36
Birch (Sweet and Yellow)	0.58	Khaya (African Mahogany)	0.42	Yellowpoplar	0.38
Pecan	0.62	Magnolia (Southern)	0.48	Port Orford White Cedar	0.40
Maple (Hard)	0.60	Mahogany (Tropical American)	0.46	Spruce (Red, and Sitka) (Quarter-Sliced)	0.36
		Maple, Soft	0.46	Sugar Pine	0.34
		Sweetgum	0.48	Noble Fire (Quarter-Sliced)	0.36
		Water-Tupelo	0.47	Western Hemlock (Quarter-Sliced)	0.40
		Black Walnut	0.52	Redwood (Quarter-Sliced)	0.38
		Douglas Fir # 1 (Quarter-Sliced)	0.45	Douglas Fir #2 (Quarter-Sliced)	0.38
		American Elm (Quarter-Sliced)	0.50	Ponderosa Pine (Quarter-Sliced)	0.38
		Sycamore	0.49		

NOTE: (1) Specific gravity based on weight and volume when oven dry.

3.1.1 Reclaimed Materials. "The plywood and aircraft flat panels shall contain reclaimed materials to the maximum extent possible without jeopardizing their intended use and performance. Reclaimed materials shall have been reprocessed, remanufactured or recycled in such a manner as to restore them to their original chemical composition and physical properties. Reclaimed materials shall include but not be limited to paper, wood, fiber products, plastic and elastomers that have been collected from solid, liquid, semi-solid or gaseous waste such as garbage, refuse or sludge."

3.2 Adhesives. The adhexives used in the manufacture of the plywood shall be of the hot-press thermosetting, phenol, melamine, or rescorinol-type conforming to MMM-A-181. Application of adhesives shall be accomplished in hot plate presses to produce joints of uniform quality.

3.3 Veneer. The veneer may be rotary cut, sliced, or sawed except as otherwise specified in Table I.

3.3.1 Thickness of veneer. Thickness of veneer shall be within the tolerances shown in Table II. These thicknesses and tolerance apply when the veneer has a moisture content of 8 to 12 percent, inclusive.

3.3.2 Specific gravity. Average specific gravity of all samples from any one crate, stack, flitch, or bolt shall not be less than the minimum specified in Table I, and the average specific gravity of any one sheet of veneer shall not be less than the minimum specified in Table I.

3.4 Defects

3.4.1 Veneer defects. Veneer containing the following defects is not acceptable:

a. Brash Wood
b. Pronounced Compression Wood (Present in coniferous species only)
c. Shakes
d. Compression Failure
e. Patching in any Form
f. Dote or any other form of decay (mineral streaks, stains, and colorations shall not be considered as defects unless associated with decay).

3.4.2 Permissible open defects. The face ply shall be free of open defects to provide a smooth finish surface. The inner plies and back may have the same permissable defects as the face, and in addition, open defects as hereinafter specified. Permissible defects may appear singly as one type only or as a combination of more than one type. When more than one type of defect is present, their total limitation, computed according to the equivalent defects given below, shall not exceed the limit specified for any one type. When defects other than those specified, or concentration of defects, are encountered, they are permitted provided their damaging effect is not more critical than those specified herein. The following shall be regarded with respect to their effect as the equivalent of one 3/8 inch sound knot:

a. One 3/8" knot hole.
b. One 3/4" sound tight burl.
c. One insect hole 2 inches in length that cuts across the grain 3/8".
d. One pitch pocket, with the product of length and width equal to 1/4" square inch.
e. One split 8 inches in length and 1/32 inch in width.

3.4.3 Defects in face plies. Permissible defects in face plies shall not exceed the limitations specified herein.

3.4.3.1 Sound tight knots. No single knot shall exceed 3/8 inch in average diameter. The total number of sound tight knots in face plies shall not be more than six in any 12 inch square, and the sum of the knot diameters in any 12 inch square shall not exceed three fourths of an inch.

3.4.3.2 Sound tight burls. No single burl shall exceed 3/4 inch in average diameter. The total number of sound tight burls in face plies shall be not more than six in any 12 inch square, and the sum of the diameters in any 12 inch square shall not exceed 1-1/2 inches.

3.4.4.3 Mild Compression Wood. Streaks of mild forms of compression wood in face plies shall not aggregate more than 10 percent of the width of the panel and shall in no case be wider than 1/2 inch.

3.4.4 Defect in inner plies and back. The following defects, in addition to those permitted in the face, are acceptable in the inner plies and back.

3.4.4.1 Knot holes. No single knot hole shall exceed 3/8 inch in average diameter. The total number of knot holes shall be not more than six in any 12 inch square and the sum of the diameters in any 12 inch square shall not exceed 3/4 inch.

3.4.4.2 Insect holes. No single hole shall exceed 2 inches in length along the grain, 1/8 inch diameter, nor cut across the grain more than 3.8 inch. The total number of insect holes shall be no more than six in any 12 inch square and the sum of the lengths across the grain shall not exceed 3/4 inch.

3.4.4.3 Pitch pockets and bark pockets. The product of the length and width of any pitch or bark pocket shall be not more than one-fourth square inch. The total number of pitch or bark pockets in any 12 inch square shall be not more than six, and the sum of the products shall not exceed one-half inch. Pockets shall be not closer than 24 inches on the same or adjacent grain lines.

3.4.4.4 Splits. Splits shall be no more than 1/32 inch in width and shall not occur more frequently than twice in any 12 inches measured perpendicular to the grain of the ply in question. The length of a split in any ply shall not exceed ten percent of the distance between the edges of a panel as measured along a line parallel to the grain of that ply and passing through the split.

3.5 Straightness of grain. In at least 90% of the area of each sheet of veneer, the slope of grain from the edge of the sheet shall not be greater than 1 in 10. When both spiral and diagonal grain are present, the combined slope shall be determined by taking the square root of the sum of the squares of the slopes of the two types of cross grains. When the slope of the grain cannot be determined using the methods specified herein, the veneer shall withstand mandrel bending tests, described in paragraph 4.6, at ratios of radius of curvature to thickness as specified in Table IV with breakage of not more than 20 percent of the specimens.

3.6 Thickness tolerances.

3.6.1 Veneer thickness. The allowable tolerances for veneer are given in Table II. The thickness of any sheet shall be considered as the average of ten or more measurements taken on the sheet.

TABLE II

Veneer Thickness and Tolerances

(8 to 12 Percent Moisture Content)

Veneer Thickness Inch	Tolerances Inch
0.011	± .001
0.020	± .002
0.030	± .002
0.034	± .003
0.040	± .003
0.047	± .003
0.060	± .003
0.068	± .004
0.080	± .004
0.095	± .004

3.6.2 Plywood Thickness. The allowable thickness and tolerances for plywood are given in Table III. The thickness of any sheet shall be considered as the average of ten or more measurements taken on the sheet.

3.7 Thickness. Unless otherwise specified (see 6.2), the thickness of individual plies, the number of plies, and the thickness of the plywood shall be as stated in Table III. All veneer of any one layer shall be of the same thickness.

3.8 Construction. All plies except the core of center ply shall occur in pairs, be of the same species, thickness and direction of grain, and on opposite sides of the core, to give symmetrical construction. Except as otherwise specified, in Table III footnote 2, all inner plies shall be of one species. In all panels of 9 plies or more the two outside plies on each side shall be of the same species and of the thickness specified in Table III. Unless otherwise specified (see 6.2), the grain of all plies shall be at right angles to the grain of adjacent plies and to the edges of the plywood.

TABLE III
Permissible Panel Construction

No of Plies	Plywood Thickness and Tolerances in inches	Thickness of Plies in Inches (8-12 Percent Moisture Content)								
		Group I or II Faces with Group III Inner Plies			All Group I or All Group II			All Group III		
		F&B	XB	C	F&B	XB	C	F&B	XB	C
3	.035±.004	--	--	--	(1) .011	--	.011	--	--	--
3	.070±.007	.020		.030	.020		.030	.020		.034
3	.100±.008	.030		.040	.030		.040	.030		.047
3	.125±.010	.034		.060	.034		.060	.034		.068
3	.155±.011	.040		.080	.040		.080	.040		.080
3	.185±.012	.047		.095	.047		.095	.047		.095
5	.160±.012	.030	.034	.030	.030	.034	.030	.030	.034	.030
5	.190±.015	.034	.047	.034	.034	.047	.030	.034	.047	.034
5	.225±.015	.040	.060	.030	.040	.060	.030	.040	.060	.034
5	.250±.015	.047	.060	.047	.047	.060	.040	.047	.060	.047
5	.315±.015	.060	.080	.047	.060	.080	.040	.060	.080	.047
5	.375±.018	.060	.095	.080	.060	.095	.080	.060	.095	.080
7	.410±.020	All Plies .060								
7	.460±.022	All Plies .068								
7	.540±.023	All Plies .080								
9	.590±.025	All Plies .068(2)								
9	.695±.028	All Plies .080(2)								
11	.085±.035	All Plies .080(2)								
11	1.010±.035	All Plies .095(2)								

NOTES: (1) All plies of 0.035 inch plywood must be of Group I species.
(2) Faces, backs, and outer cross-bands of plywood having nine or more plies must be of the same species.

CODE: F&B = Face and Back; XB = Cross Bands; C = Core

3.9 Panel Size. Unless otherwise specified (see 6.2), the nominal width and length shall be 48 by 96 inch panels.

3.10 Panel trimming. Trimming for length and width shall be full and true. A tolerance of plus 1/4 inch will be allowed in length and width of panels. Panels

exceeding 35 inches in width or 59 inches in length may be reduced 6 inches in either or both length or width to eliminate defects which may occur on the edge of the panels. The number of panels thus altered shall not exceed 5 percent of the total number of panels of any lot or shipment.

3.11 Surfaces. Plywood shall be smooth, flat, and free from blisters, wrinkles, laps and other defects not specifically permitted. The surfaces of the finished plywood shall be free from glue, oil, wax, paraffin, tape, or any other substances that will prevent the adhesion of glue or paint finishes. Spot sanding that results in no appreciable change in thickness may be permitted with other limitation. Otherwise if panels are sanded, sanding shall be accomplished on both sides. Sanding shall not reduce the thickness of the face plies by more than 5 percent of their normal thickness.

3.12 Joints

3.12.1 Edge joints. Plywood shall have all plies either of one-piece veneer, or of two or more pieces, properly glued on the edges. Joints shall run parallel with the grain of the pieces. Edges of the pieces of veneer shall be jointed straight and square and shall be glued with a water-resistant glue. No metal staples or tape shall be used. In plies other than the face, open joints will be permitted provided that the opening in any one joint does not exceed 1/32.

3.12.2 Scarfing. Large plywood panels may be made from two or more smaller panels by scarfing. The slope of scarfs shall not be greater than 1 in 12. The scarfs shall be glued in a hot-press with thermo-setting, synthetic-resin adhesives.

3.13 Moisture content. Moisture content of all veneers, which are to form any one panel, shall not vary more than 3 percent from the minimum to the maximum at the time of gluing. The finished plywood shall be conditioned to a moisture content of not less than 8 percent nor more than 12 percent.

3.14 Shearing strength. Specimens shall be subjected to shear tests described in Section 4. The test specimens shall not show delamination or separation at the bond lines before testing or during the boiling period. When the test specimens have an average shear strength of less than 250 psi, they shall show not less than 30 percent minimum and 60 percent average wood failure. When the test specimens have an average shear strength ranging from 250 to 400 psi, they will show not less than 15 percent minimum and 30 percent average wood failure. Specimens having shear strength greater than 400 psi, no wood failure shall be required.

3.15 Exterior type heat durability. When tested as specified in 4.6.5 the plywood shall show no glueline delamination due to combustion.

3.16 Identification. Each sheet of plywood shall have marked on the face with suitable light-fast, durable non-bleeding marking fluid, in letters not less than 1/4 inch high with the following data:

Nomenclature
Manufacturer's Name

Number of Plies
Panel Thickness
Species of Face
Species of Inner Plies
Contract Number
Federal Stock Number
US

3.17 Workmanship. All details of workmanship shall be in accordance with high-grade aircraft plywood manufacturing practice for flatness, smoothness, uniformity of thickness, and tightness of cut prevailing among manufacturers normally producing aircraft flat panel plywood and veneer specified herein.

4. Quality Assurance Provisions

4.1 Responsibility for inspection. Unless otherwise specified in the contract or order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Inspection lot. A lot shall consist of all aircraft flat panel plywood of the same material size, thickness, and number of plies offered for delivery to the Government at one time.

4.3 Quality conformance inspection. Quality conformance inspection shall be applied as specified to plywood and veneer prior to being offered for acceptance under the contract. Failure of the plywood and veneer to pass the examination or one or more tests shall be cause for rejection. Unless otherwise specified (see 6.2), quality conformance inspection shall consist of the following:

(a) Examination (4.5)

(b) Tests (4.6)

(c) Inspection of preparation for delivery (4.7).

4.4 Sampling

4.4.1 Sampling for examination. All veneer and finished aircraft plywood in any lot or shipment shall be examined.

4.4.2 Sampling for tests. Sampling for tests shall be as specified.

4.4.2.1 Sampling for straightness of grain. Each sheet of veneer shall be inspected visually. If mandrel bending tests are made (see 3.5), the number of sheets to be tested shall be not less than one sheet from each flitch or five sheets from each crate or stack of veneer shall be selected. From each sheet of veneer selected for tests, bending specimens shall be cut from the

entire width within 24 inches of each end, and at intervals not to exceed 6 feet along the length of the sheet in such a way that the specimens shall include representative proportions of any areas in which slope of grain is greater than 1 in 10. When both spiral and diagonal grain are present, the slope of the grain shall be determined in accordance with 3.5.

4.4.2.2 Sampling for specific gravity tests. Samples shall be selected from each crate, stack, bolt, or flitch from which veneer is used. If taken after the veneer is cut, each crate or stack shall be represented by not less than 20 specimens. The samples shall be taken from at least 4 sheets, and the specimens shall be from areas uniformly distributed over each selected sheet of veneer. If samples are taken before the veneer is cut, each bolt or flitch shall be represented by not less than 10 speciments. The samples shall be taken from each end of each bolt or flitch.

4.4.2.3 Sampling for shear tests on glue joint. A random sample shall be selected in accordance with MIL-STD-105 at inspection level S-1. The AQL shall be 2.5 percent defective.

4.4.2.4 Sampling for determing moisture content. A random sample shall be selected from each inspection lot in accordance with MIL-STD-105 at inspection level S-1. The AQL shall be 4.0 percent defective.

4.4.3 Sampling for inspection of preparation for delivery. Packaging, packing marking for shipment and storage shall be inspected to determine conformance with the requirements of Section 5. The sample unit shall be one shipping container and the lot size shall be the number of containers offered for delivery at one time. The inspection level shall be S-2 in accordance with MIL-STD-105 with an AQL of 4.0 percent defective.

4.5 Examination of product. All veneer and finished aircraft plywood shall be examined to determine conformance with the requirements of this specification for workmanship, construction, thickness, straightness of grain, defects, joints, size and finish. Any deviation from these requirements shall be cause for rejection.

4.6 Tests

4.6.1 Testing straightness of grain. The slope of grain requirement in 3.5 shall be determined by combining the grain direction of two adjacent faces of a square or rectangular piece. When one or more faces is straight grained, the true slope of the grain is shown on the other face. When there is a slope on both faces, the true or combined slope is greater than the slope on either face. Slope of grain is shown on edge-grained faces by summer-wood bands; by the direction in which a free flowing ink or dye spreads; by the course taken by a narrow strip lifted bya knife point and torn out, or by the Teco or equal slope-grain detector. Slope of grain from the edge of the sheet may be readily determined in rotary cut veneer by tearing the sheet and measuring the slope of the tear.

4.6.1.2 Mandrel bending tests. The size of the specimen for mandrel bending tests, when required, (see 3.5), shall be one inch wide across the grain of

the veneer and between nine and eleven inches in length. The ration of the radius of the mandrel to the thickness of the veneer shall be as specified in Table IV. The specimens shall be cut with the minimum slope of grain from the edges and shall be oven dry at the time of the test. Upon test, the tight side of the veneer shall be outward and the open side against the mandrel. The specimens shall be bent at the specified radius to a parallel-sided "U" shape without support on the tension side. Breakage shall consist of fractures extending 1/8 inch or more across the width of the specimen. Tears along the fiber direction that begin at the edge and extend into the specimen along grain sloping from the edge shall not be considered breakage. Whether a specimen breaks shall be determined before removal from the mandrel. Breakage of more than 20 percent of all the specimens tested shall be considered cause for rejection of the flitch, crate, or stack.

4.6.2 Specific gravity tests. Specific gravity of veneer shall be determined in accordance with ASTM D2395. The thickness shall be measured to the nearest 0.001 inch. Specimens may be oven dry at time of test or the weighings may be made at the prevailing moisture contents providing that the proper corrections are made to convert to oven-dry weight and volume for comparison with the values in Table I. If the average specific gravity of the specimens selected is below the minimum specified in Table I, additional specimens, at least 20 from at least 4 additional sheets of veneer or at least 10 from each end of each bolt or flitch, shall be cut and the specific gravity determined. If the average specific gravity of all specimens (original specimens plus additional specimens) is below the minimum specified in Table I, the veneer from that crate, stack, bolt or flitch shall be rejected. If the average of all determinations is above the minimum but the average specific gravities of individual sheets are below the minimum specified in Table I, those individual sheets whose average specific gravity is below the minimum shall be rejected.

4.6.3 Moisture content test. Plywood and veneer shall be tested for compliance with ASTM D2395.

TABLE IV

Ratio of Radius (R) of mandrel to Thickness (T) of different species for use in mandrel bending tests.

	Groups of Species		
Thickness of Veneer	Basswood, Soft Maple, Yellowpoplar, Water Tupelo, Sycamore Mahogany Khaya	Magnolia, American Elm, Sweetgum, Birch, Alaska and Paper Recan, Black Walnut, Sugar Maple, Yellow birch, Beech	Douglas-fir Noble Fir Western hemlock Spruce, White Red, and Sitka Port Orford White Cedar Pine ponderosa Pine, sugar

Inches	Ratio R/T		
0.011 and 0.020	46	34	47
0.030	46	34	57
0.034 to 0.047	50	40	57
0.060	55	50	67

4.6.4 Shear tests on glue joints. Dry shear and wet shear tests on glue joints shall be performed in accordance with Federal Test Method Standard No. 175, using ASTM D906 and ASTM D1151 to determine compliance with paragraph 3.14. Plywood consisting of more than 3 plies shall be stripped of all except the three selected for test. Plywood containing 7 piles, and over, tests shall be made on both the center three plies and either or both of the outer three plies. If shear tests fail to meet either the dry or wet shear requirements, the lot represented shall be rejected or at the option of the manufacturer and with consent of the Government each panel of the lot may be individually tested and rejected or accepted.

4.6.5 Heat durability test. One fire test specimen shall be taken at random from any test sample representative of one lot. Testing shall be in accordance with PS 1-83. If the one specimen fails the test, this shall be cause for rejection of the entire lot.

4.7 Inspection of preparation for delivery. Packaging, packing and marking for shipment shall be examined to determine conformance with Section 5. Defects shall be as indicated in Table V.

Visual defects, preparation for delivery

Examination	Defect
Marking	Omitted; incorrect; illegible; improper size, location, or method of application.
Materials	Waster sheets not specified. Component missing or damaged, edge protectors not as specified.
Workmanship	Loose strapping; incomplete closure blocking and cushioning inadequate or missing; bulged or distorted container; plywood not blocked to prevent movement.

6. NOTES

6.1 Intended Use. Plywood covered by this specification is intended for use in the fabrication of structural or highly stressed parts of aircraft such as wing and fuselage covering, wing rib webs, etc.

6.2 Ordering data. Procurement documents should specify the following:

a. Title number and date of this specification.

b. Species of wood used for faces and inner plies (see 3.1).

c. Thickness of individual plies, number of plies, and thickness of plywood (see 3.7).

d. Direction of grain, if different (see 3.8).

e. Width and length of panels, if different (see 3.9).

f. Responsibility for inspection, if different (see 4.1).

g. Quality conformance inspection, if different (see 4.3).

h. Level of packaging and packing required (see 5.1 and 5.2).

i. Marking, if different (see 5.3).

6.3 Multiple sizes. Multiple sizes may be furnished under theis specification. The number of multiples in size to be furnished shall be acceptable to the purchaser and a sufficient excess of material to allow for cutting the panel to the required size or sizes shall be provided by the plywood manufacturer.

6.4 Standard sizes. Procurement of aircraft plywood will be expedited and simplified, with less waste of materials and labor on the part of the manufacturer, if the grade, type and construction details, provided for in this specification are followed. Ordering of plywood of large sizes that is later cut to smaller sizes, diagonal grained plywood, veneer of unusual thickness, and more restrictive provisions that herein specified limit the amount of material available and increase the time required for manufacture. Such special requirements should be avoided as much as possible.

6.5 Compression wood. Pronounced compression wood ordinarily has wide annual rings, less than six per inch, and summerwood that lacks definite contract in appearance with adjacent spring wood. Summerwood of mild compression wood usually occupies less than one-third of the width of the annual rings, and is contrasting and well defined from adjacent springwood.

"6.6 Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue."

5. Packaging

5.1 Packaging. Packaging shall be level A, B, or C as specified. (see 6.2).

5.1.2 Levels A and B. Each shipping container in so far as possible shall contain the same quantities of plywood of the same species, length, width, thickness and description, except one container of each size and description of plywood may contain a lesser quantity in order to complete the shipment of the total specified quantity on the contract. Plywood shall be stacked so as to provide a square edge on one side and one end of the pack. The face of the top and bottom panels shall be placed toward the center of the pack. Battens shall be used under each girthwise strap.

5.1.3 Level C. The plywood and veneer may be packaged in accordance with the supplier's standard practice.

5.2 Packing. Packing shall be level A, B, or C as specified. (see 6.2).

5.2.1 Level A. The top and bottom of plywood stacks shall be protected with waster sheets of 1/4 inch minimum thickness and of the same length and width as plywood panels in the pack. All sides and ends of the stack shall be protected by waster sheets of 1/4 inch minimum thickness and length and width sufficient to cover all edges and ends of the plywood in the stack. Wooden battens of 3 inch by 4 inch nominal lumber shall be nailed to the bottom waster sheet prior to assembly of the pack. Waster sheets shall be secured to the pack by strapping conforming to QQ-S-781, Type I, Class A or B. All packs under 144 inches and longer shall have a minimum of four girth straps and 2 longitudinal staps. Girth straps shall be spaced equal distances from the end straps and from each other. Longitudinal straps shall pass between the stacks and batten Girth straps shall pass over the battens. Metal or plastic angle edge protect shall be placed at all corners under straps except on the end of battens.

5.2.2 Level B. The top and bottom of plywood stacks shall be protected with waster sheets of 1/4 inch minimum thickness and of the same length and width as plywood in the pack. Wooden battens of 3 inch by 4 inch nominal lumber shall be nailed to the bottom waster sheet prior to assembly of the pack. Waster sheets shall be secured to the pack by strapping conforming to QQ-S-781, Type I, Class A or B. All packs shall have a minimum of two girth straps approximately 12 inches from each end and one longitudinal strap along the centerline of the pack. Longitudinal straps shall pass between the stacks and battens. Girth straps shall pass over the battens. Metal angle protectors shall be placed at all corners under straps except on the end of battens.

5.2.3 Level C. Plywood shall be packed in manner which will insure arrival at destination in satisfactory condition and be acceptable to the carrier at lowest rates. Containers and packing shall comply with Uniform Freight Classification Rules or National Motor Freight Classification Rules.

5.3 Marking of Shipments. Unless otherwise specified (see 6.2), marking shall conform to MIL-STD-129.

Custodians:
Air Force - 99
Navy - SH

Preparing Activity:
Air Force - 84

User Activities:
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(Project No. 5530-F039)

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