

MIL-P-8053C(ASG)

5 OCTOBER 1965

Superseding
MIL-P-8053B(ASG)
28 July 1954

MILITARY SPECIFICATION

PLYWOOD, METAL-FACED

This specification has been approved by the Department of the Air Force and by the Bureau of Naval Weapons.

1. SCOPE

1.1 Scope.-- This specification covers metal-faced plywood.

1.2 Classification.-- Metal-faced plywood shall be one of the following types, as specified (see 6.2):

Type I - Aluminum faced
Type II - Coated-steel faced
Type III - Stainless-steel faced

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONSFederal

NN-P-530	Plywood; Flat Panel
QQ-A-250/2	Aluminum Alloy 3003, Plate and Sheet
QQ-S-775	Steel Sheets, Carbon, Zinc-Coated
TT-P-320	Pigment, Aluminum; Powder and Paste, for Paint
TT-V-119	Varnish, Spar, Phenolic-Resin
PPP-C-650	Crates, Wood, Open and Covered
MM-A-181	Adhesive, Room Temperature and Intermediate-Temperature Setting Resin (Phenol, Resorcinol, and Melamine Base)

Military

MIL-S-5059	Steel, Corrosion-Resistant (18-8), Plate, Sheet and Strip
MIL-A-5090	Adhesives, Heat Resistant, Airframe Structural, Metal to Metal
MIL-F-14072	Finishes for Ground Signal Equipment

PSC 5680

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STANDARDS

Military

MIL-STD-129 Marking for Shipment and Storage

(Copies of specifications, 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.)

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:

Department of Commerce

Commercial Standards

CS 35	Hardwood plywood
CS 45	Douglas fir and western larch
CS 122	Western softwood
CS 259	Southern pine

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

3. REQUIREMENTS

3.1 Materials.- Materials shall be as specified herein. When materials which are not specifically designated are used, they shall be entirely suitable for the purpose.

3.1.1 Plywood.- The requirements for veneer and plywood shall be those of applicable grades in accordance with NN-P-530, except as modified herein. The thickness tolerance of the completed metal-faced panels shall be $\pm 1/64$ inch. The trimming for length and width shall be full and true. The difference in length between the 2 diagonals of a 48- by 96-inch panel shall not exceed $1/8$ inch, and for larger or smaller panels, the tolerance shall be proportionately more or less. A tolerance of $\pm 1/32$ inch will be allowed in the length and width, or both, of the panels. Commercial softwood or hardwood plywood shall be used. In defining the plywood construction, the metal facings shall not be counted in the number of plies.

3.1.1.1 Softwood plywood.- Exterior plywood shall conform to grade A-C, B-B, or A-A, or better of CS-45, CS-122, or CS-259.

3.1.1.2 Hardwood plywood.- Type I, fully waterproof-bond plywood, solid and sanded on two sides (no grade of veneer lower than 2 for face veneer, and no grade lower than 3 for inner plies) shall be used. The veneer quality and plywood construction shall conform to CS 35. The species and densities shall be those specified by the procuring activity. The plywood glue bond shall meet the test requirements specified in the paragraph titled "Cyclic boil test" of CS 35.

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3.1.2 Metal surfacing.- The metal surfaces shall be aluminum alloy, coated steel, and stainless steel, as specified in the order, and shall be smooth and free from dents and creases. If any other metal is desired for facing by the procuring activity, it shall be in accordance with applicable Government specifications referenced in the particular order. In defining the plywood construction, the metal facings shall not be counted in the number of plies. The metal shall be bonded to both surfaces and shall be of the same thickness on both surfaces. The same or dissimilar metals may be used on opposite surfaces. The procuring activity will specify the desired assembly. (See 6.2.)

3.1.2.1 Aluminum alloy.- The alloy shall be mill finish, and shall conform to QQ-A-250/2. The condition shall be as specified by the procuring activity.

3.1.2.2 Zinc-coated steel.- The steel shall conform to class d of QQ-S-775.

3.1.2.3 Phosphate-coated ("bonderized") steel.- The protective coating shall conform to finish P211 of MIL-F-14072. Unless otherwise specified by the procuring activity, the base metal shall conform to QQ-S-775. Phosphate-coated steel shall be used as plywood facing only when the finished panels are subsequently to be painted and used in installations where the likelihood of damage to paint film and subsequent corrosion of metal is remote.

3.1.2.4 Stainless steel.- The stainless steel shall be 18-8 corrosion-resistant steel, of composition and hardness as specified by the procuring activity. The 18-8 grade steel shall conform to MIL-S-5059.

3.1.3 Metal surface bonding.- The metal surfaces shall not delaminate from the plywood, and there shall be no separation at the edges of the surfacing material from the plywood, as tested by visual examination in accordance with section 4 of this specification. The average shear strength of the metal-to-wood bonds of the dry specimens shall be not less than 250 psi, and the average shear strength of the metal-to-wood bonds of the wet specimens shall be not less than 200 psi.

3.1.3.1 Adhesive.- The adhesive used for bonding the metal to wood may be a synthetic rubber latex-protein combination, or other type of adhesive which will have the strength and water resistance specified in 3.1.3. Since the adhesive is in contact with the metal, the pH shall be near or at the neutral point, in order to prevent corrosion of the metal. The pH of the liquid adhesive at the time of bonding shall be not less than 6.5 nor more than 8.5. The moisture content of the plywood panel, after bonding with this type adhesive, shall not exceed 12 percent based on weight of wood.

3.1.3.2 Alternative adhesive system.- A two-step process may be used which is more moisture resistant than the method given in 3.1.3.1. Adhesives in accordance with MIL-A-5090 shall be applied to one surface of each of the metal faces and cured according to the directions of the manufacturer. After curing, the cured adhesive surface shall be lightly sanded with fine sand paper and wiped with a clean cloth. The adhesive-coated metal surfaces shall then be bonded to the plywood surface with an adhesive conforming to type of MMM-A-181.

3.2 Machining.- The surface material shall not locally separate from the plywood when machined with ordinary shop tools similar to band saws, circular saws, drills, routers, and the like.

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3.3 Color and finishing.- Unless otherwise specified by the procuring activity, the material shall be furnished with bare metal faces.

3.4 Edge treatment.- The edges of the panels shall be sealed with two coats of a spar varnish highly pigmented with flake aluminum to resist moisture absorption. This moisture barrier shall be formulated in the following proportions: 1 gallon of phenolic varnish conforming to TT-V-119 pigmented with 1-1/2 pounds of aluminum paste conforming to TT-P-320. At least 24 hours drying time shall be accorded each coat. Any splits showing on edges before they are sealed shall be plugged with wooden wedges dipped in adhesive conforming to type MMH-A-181.

3.4.1 Alternative edge treatment.- Metal edge strips, bonded in place, may be used in lieu of the treatment specified in 3.4.

3.5 Workmanship.- The workmanship shall be in accordance with the best commercial practice covering this class of work.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection.- Unless otherwise specified in the contract or purchase 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 Classification of inspections.- All the inspections required herein for the testing of metal-faced plywood are classified as quality conformance inspections.

4.3 Examination of product.- Each panel of metal-faced plywood offered for delivery on a Government contract or order shall be subject to examination to determine compliance with the requirements of this specification not specified by tests.

4.4 Sampling tests.- Unless otherwise specified by the procuring activity, samples shall consist of 1 percent of the panels in each lot offered for delivery on one contract or order. Each sample panel shall be quartered into test samples which shall be measured as specified in 4.4.1. Test specimens cut from the panels shall then be cut as specified in 4.4.2.1 and 4.4.3.1. These specimens shall be used for subsequent testing in accordance with the respective procedures of 4.4.2.2.1, 4.4.2.2.2, 4.4.3.2.1, and 4.4.3.2.2. A lot shall consist of 500 panels or a fraction thereof manufactured in one continuous production run to the same dimensions, the same number and thicknesses of plies, and from the same materials. Fractional lots shall be sampled with one full panel replacing any fractional panel resulting from the above 1 percent stipulation.

4.4.1 Thickness measurement.- At least two micrometer thickness measurements shall be made on each of the four specimens from each panel selected for test to determine compliance with the requirements of 3.1.1.

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4.4.2 Bonding tests.

4.4.2.1 Specimens.— Eighteen bonding test specimens, 1 inch by 3-1/4 inches each, shall be cut from each of the 4 test samples previously cut from each sample panel.

4.4.2.2 Method.

4.4.2.2.1 Plywood bond.— Six of each 18 bonding test specimens of 4.4.2.1 shall be tested for plywood bonds in accordance with the paragraph titled "Boiling test" of CS 45 or the paragraph titled "Cyclic boil test" of CS 35, whichever is applicable.

4.4.2.2.2 Metal-to-wood bond.— Six of each 18 bonding test specimens of 4.4.2.1 shall be tested dry and the remaining 6 specimens of each 18 of 4.4.2.1 shall be tested wet after a 48-hour soak in water at room temperature. The test specimen shall conform to figure 1. Half of the specimens shall be so cut as to test the bond of the front face, and the other half shall be so cut as to test the bond of the back face. The specimens shall be so loaded in the test grips that the line of force through the test fixtures coincides as nearly as possible with the metal-to-wood joint under the test. The average dry and wet shear strengths shall be as specified in 3.1.3.

4.4.3 Machining tests.

4.4.3.1 Specimens.— One machining test specimen measuring 6 inches with the grain by 18 inches across the grain of the face plies shall be cut from each of the 4 test samples previously cut from each sample panel.

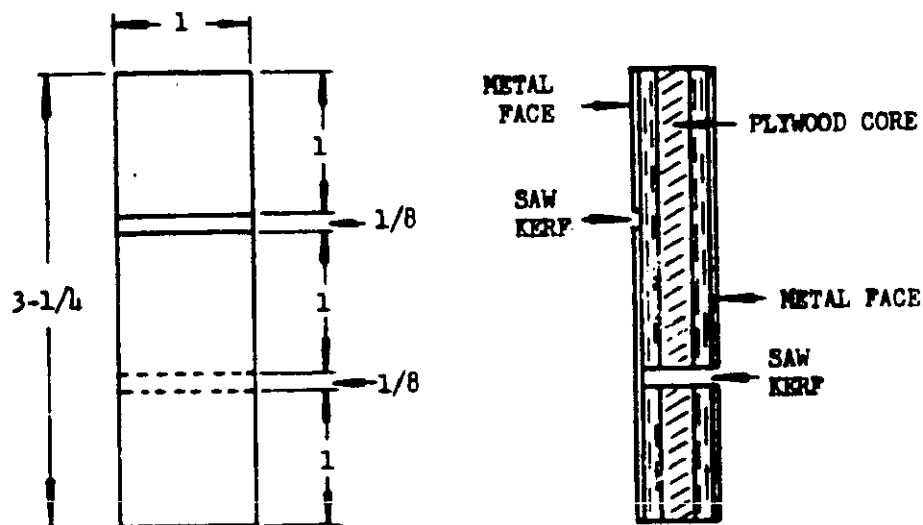
4.4.3.2 Method.

4.4.3.2.1 Sawing.— The specimens described in 4.4.3.1 shall be sawed entirely across, both laterally and longitudinally, with a 5/8-inch, 20-gage, sharp bandsaw having 8 teeth per inch and a cutting speed of 11,000 fpm. The edges of these cuts on the 4 resulting pieces shall be critically examined, with a 10X lens, for separation between the plywood core and the metal faces.

4.4.3.2.2 Drilling.— The four pieces, cut as described in paragraph 4.4.3.2.1, shall then be placed on a softwood block and drilled with a sharp 1/4-inch ordinary metal-cutting twist drill, at least four times in each piece. Both sides of each piece shall be critically examined, at the holes with a 10X lens, for separation between the plywood core and the metal faces.

4.5 Rejection and retest.— Failure of more than 10 percent of specimens from any one sample panel tested in conformance with the procedures of either 4.4.2.2.1, 4.4.2.2.2, 4.4.3.2.1, or 4.4.3.2.2 to conform to the respective applicable requirements of 3.1.1.1, 3.1.1.2, and 3.2 shall be cause for rejection of the lot represented. However, a retest will be permitted, using double the number of specimens cut as above from a sufficient number of additional sample panels taken from the same lot. Failure of more than 10 percent of the retest specimens to conform to the above respective requirements shall require final rejection of the lot represented. Further rejection shall be made of any panel which is not found to be in compliance with any other requirement of this specification. Metal-faced plywood lots rejected after retest shall not be resubmitted without the specific approval of the procuring activity.

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TEST SPECIMENS SHALL BE SO CUT THAT THE SAW KERFS
WILL BE RIGHT ANGLES TO THE GRAIN DIRECTION OF THE
PLYWOOD FACE PLIES.

DIMENSIONS IN INCHES.

FIGURE 1. Metal-to-wood bond test specimen

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4.6 Packing and marking.- Preparation for delivery shall be examined for conformance to section 5.

5. PREPARATION FOR DELIVERY

5.1 Packing.- Unless otherwise specified, metal-faced plywood shall receive level B packing. The gross weight of the shipping containers when packed for shipment shall not exceed 200 pounds, whenever practicable. Nails shall not be driven into any of the material comprising the shipment.

5.1.1 Level B.- When domestic shipment has been specified, the metal-faced plywood shall be packed in exterior shipping containers which shall conform to PPP-C-650.

5.1.2 Level A.- Unless otherwise specified, for overseas shipment, metal-faced plywood shall be packed in crates in accordance with PPP-C-650.

5.2 Marking of shipments.- The exterior shipping container shall be marked in accordance with MIL-STD-129 and as specified herein. The nomenclature shall be as follows:

PLYWOOD, METAL-FACED

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Type 1/

Manufacturer's part No., name, or trademark 1/

Government order or contract No. 1/

Federal Stock No. 1/, (if no FSN available, leave space therefor)

Species of plies 1/

No. of plies per panel 1/

Dimensions of panel: Thickness 1/, width 1/, length 1/,

Quantity 1/

Thickness of metal faces 1/

Metal used for faces 1/

1/ Information to be entered by manufacturer

6. NOTES

6.1 Intended use.- The metal-faced plywood covered by this specification is intended for use in fabricating ground equipment and for nonstructural parts of aircraft, but is not to be used for either primary or secondary structural aircraft purposes. It may be used as covering to prevent damage to structural floors of cargo aircraft, or as sideplates for fuselage rings to prevent damage to equipment which is being parachuted, or as covering for loading ramps.

6.2 Ordering data.- The orders should contain at least the following items:

- (a) Title, number and date of this specification.
- (b) Thickness of metal faces (see 3.1.2.1 through 3.1.2.4).
- (c) Type of metal faces (see 1.2 and 3.1.2).
- (d) Thickness of plywood (see 3.1.1).

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- (e) Species of plywood (see 3.1.1.1 and 3.1.1.2).
- (f) Number and thicknesses of veneer plies.
- (g) Size and total thickness of finished panels
(see 3.1.1 and 3.1.2).
- (h) Type of edge treatment (see 3.4 and 3.4.1).
- (i) Level of packing desired (see 5.1).

Custodians:

Navy - WP
Air Force - (11)

Preparing activity:

Air Force - (11)

Reviewer activities:

Navy - WP
Air Force - (11) (69)

User activities:

Navy - YD
Air Force -

FOLD

POSTAGE AND FEES PAID
DEFENSE SUPPLY AGENCY

DEFENSE SUPPLY AGENCY
OFFICIAL BUSINESS

Aeronautical Standards Group (ASG)
8719 Colesville Rd.
Silver Spring, Md. 20910

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SPECIFICATION ANALYSIS SHEET

Form Approved Budget
Bureau No. 119-ROO4INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity.

SPECIFICATION

MIL-P-8053C(ASG) Plywood, Metal-Faced

ORGANIZATION

CITY AND STATE

CONTRACT NO.

QUANTITY OF ITEMS PROCURED

DOLLAR AMOUNT

\$

MATERIAL PROCURED UNDER A

☒ Direct Government Contract☐ Subcontract

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES☐ NO

IF "YES" IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.)

SUBMITTED BY (Printed or typed name and activity)

DATE

DD Form 1426