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MILITARY SPECIFICATION

LUMBER AND PLYWOOD, FIRE-RETARDANT TREATED

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

1. SCOPE

1.1 Scope. This specification covers requirements for fire-retardant treated lumber and plywood, including laminated veneer lumber processed by pressure impregnation, using qualified fire-retardant chemical treatments.

1.2 Classification.

1.2.1 Types. The fire-retardant treated lumber and plywood shall be of the following types based on the durability of the treatment (see 6.2.1):

Type I - Non-weather-resistant (for interior use).
Type II - Weather resistant (for interior or exterior use).

1.2.2 Categories. The treated lumber and plywood shall be of the following categories based on use (see 6.2.1):

Category 1 - General use.
Category 2 - Naval shipbuilding and repair.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 5510

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications. Unless otherwise specified, the following specifications 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.

SPECIFICATIONS

FEDERAL

MM-L-736 - Lumber; Hardwood.
MM-L-751 - Lumber; Softwood.
NN-P-530 - Plywood, Flat Panel.

MILITARY

MIL-L-14362 - Lumber: Unitizing and Loading of.
MIL-P-18066 - Plywood, Ship and Boat Construction.

(Copies of specifications required by contractors in connection with specific acquisition functions should be obtained from the contracting 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. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

AMERICAN WOOD PRESERVER'S ASSOCIATION (AWPA) STANDARDS

C1 - Preservative Treatment of All Timber Products by Pressure Treatment General Requirements.
C20 - Treatment of Structural Lumber, Fire-Retardant by Pressure Treatment.
C27 - Treatment of Plywood, Fire-Retardant by Pressure Treatment.
M2 - Instructions for the Inspection of Treated Lumber Products.
M3 - Standard Quality Control Procedures for Wood Preserving Plants.
M6 - Brands Used on Forest Products.

(Application for copies should be addressed to the American Wood Preserver's Association, P.O. Box 849, Stevensville, MD 21666.)

ASTM

D 143 - Small Clear Specimens of Timber. (DoD adopted)
D 2016 - Moisture Content of Wood. (DoD adopted)
D 2898 - Accelerated Weathering of Fire-Retardant Treated Wood for Fire Testing.
E 69 - Combustible Properties for Treated Wood by the Fire-Tube Apparatus.
E 84 - Surface Burning Characteristics of Building Materials. (DoD adopted)

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

(Industry association specifications and standards are generally available for reference 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 references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Qualification. The fire-retardant treated lumber and plywood furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.3 and 6.5).

3.2 Material.

3.2.1 Pressure treatment. Lumber shall be given pressure treatment in accordance with AWPA C1 and C20. Plywood shall be given pressure treatment in accordance with AWPA C1 and C27. Whenever the quantity to be treated is sufficient, lumber (or plywood) of different thicknesses shall be treated in separate charges. For treating species other than those covered by AWPA standards, the AWPA schedule for the species having treating characteristics most closely resembling those of the one to be treated, shall be followed.

3.2.2 Species or types. The lumber or plywood furnished under this specification shall be of those species or types which are receptive to pressure impregnation (see 6.3). Material treated shall be of such quality as to meet the grade ordered, after treatment and drying. Material shall be ordered in accordance with MM-L-736 and MM-L-751 for lumber and MIL-P-18066 and NN-P-530 for plywood.

3.2.3 Incising.

3.2.3.1 Lumber. Unless otherwise specified (see 6.2.1), incising of a species is required if that species had been incised in qualification approval tests. Lumber may be incised to a depth of 3/8 inch if necessary to achieve adequate impregnation. Incising shall not be permitted if unsuitable for end use.

3.2.3.2 Plywood. Plywood shall not be incised.

3.2.4 Drying and conditioning. Drying procedures shall be such as to minimize warping and end and surface checking, and shall not cause significant deterioration of the material. Maximum temperature shall not exceed 160 degrees Fahrenheit (°F) (71 degrees Celsius (°C)) during drying and conditioning, unless a higher temperature is a necessary part of the fire retardant processing. In this case, the maximum temperature and the curing schedule used, above 160°F (71°C), will be made a part of qualification testing and quality conformance inspection. Kiln drying, air seasoning or partial air seasoning followed by kiln drying, may be employed at the option of the contractor provided that the applicable moisture content requirements can be met within delivery date specified in the contract or order.

3.3 Fire retardance.

3.3.1 Surface burning characteristics. The treated lumber, plywood or laminated veneer lumber shall have a flamespread index of 25 or less, when tested as specified in 4.6.1.1. In a test of 30 minute duration, the material shall exhibit a flame spread not over the equivalent of 25 and no evidence of significant progressive combustion. Type II material shall be tested for surface burning characteristics after weathering as specified in 4.6.1.1.1.

3.3.2 Weight loss. The average final percent loss of weight of the treated wood samples by the fire tube test (4.6.1.2) shall be equal or less than that obtained with the treated approved specimens tested for qualification. The final percent weight loss of any sample shall not exceed the qualification value by more than 5 percentage points.

3.4 Strength retention. The average modulus of elasticity and modulus of rupture values for the treated wood shall be 80 percent or more and the average work to maximum load value shall be 65 percent or more as compared to values for these properties of unincised, untreated wood when tested as specified in 4.6.2.

3.5 Hygroscopicity. The treated lumber or plywood shall not exude chemicals or have an indicated moisture content greater than 30 percent when conditioned as specified in 4.6.3.

3.6 Acidity. The extract solution of the treated wood shall develop a pH value of not less than 3.0 when tested as specified in 4.6.4.

3.7 Corrosiveness. The extract solution shall not show corrosion rates greater than 25 mils per year for any of the three metal alloys when tested as specified in 4.6.5.1 or 4.6.5.2.

3.8 Toxicity. The chemicals used for impregnation shall not be of a nature to create hazards during handling or working with the finished product. Neither shall the treated lumber or plywood emit noxious volatiles when used under normal temperatures not exceeding 120°F (49°C) (see 4.7).

3.9 Color and paintability. The fire-retardant treatment itself (not including any identifying blue stain or dye) shall not materially change the color of the lumber or plywood. The treated wood shall take oil sealers, oil stain, varnish, wax, nonaqueous stain finish or paint. For type II treatment, if blue stain or dye is not wanted, it should be so specified (see 6.2.1).

3.10 Penetration. The depth of chemical penetration in the faces of the treated lumber or plywood, as specified in 4.6.6, shall be equal to or better than the material granted qualification approval (see 4.3.1).

3.11 Solution concentration and chemical composition. The solution sample, taken from the autoclave following the treatment of the lot of lumber or plywood, shall have a concentration of the fire-retardant salts equal to or exceeding the concentration of these salts in the solution used in preparing the treated wood of the same species approved for qualification. Chemical composition of the solution shall be identical to that used in qualifying the treatment. The concentration and chemical composition of fire-retardant salts in the solution shall be determined as specified in 4.6.7.

3.12 Moisture content. Unless otherwise specified (see 6.2.1), the moisture content of fire-retardant treated lumber or plywood at the time of delivery, shall not exceed the following limitations when tested as specified in 4.6.8:

Lumber less than 4 inches in thickness (nominal)	19 percent
Lumber 4 inches and over in thickness (nominal)	Any stage of seasoning
Plywood, all thicknesses	14 percent

In lumber or plywood 2 inches or less in thickness, the difference in moisture content between shell and core shall not exceed 3 percent.

3.13 Material identification. Individual pieces of treated material shall be identified according to the use category as specified (see 6.2.1).

3.13.1 Category 1 (general use). Each piece shall be legibly marked on or near each end with the chemical designation or treatment name and the symbol FR or FRX for type I or type II treatments, as applicable. When specified (see 6.2.1), each piece shall be marked at no greater than 3 foot intervals on at least one edge or face with the following information as required. Marking shall be legible and indelible and may be coded in accordance with the symbols of AWPA M6:

(a) Treater's brand symbol or treatment name.
(b) Testing laboratory symbol or label.

3.13.2 Category 2 (Naval shipbuilding and repair use). This category only applies to type II material and unless otherwise specified (see 6.2.1), to only staging (scaffold) plank material and plywood. Staging planks shall be legibly marked using a burned-in brand having characters at least 3/4-inch tall and 1/16-inch deep with the following designation:

(a) FR-X.
(b) Numerals for last two digits of year of treatment.
(c) A numeral designator assigned to the manufacturer to denote the treatment name and the specific treating plant. Manufacturer may add a treatment symbol or trademark if desired.

Some space shall be allowed between the character groups of (a), (b), and (c) to aid legibility. This designation shall appear at least once on each edge, at alternate ends, near the end but not closer than 18 inches from the end.

Additionally, planks shall be colored with a permanent, weather-proof, non-smudging dye or stain (nonfilm-forming type) of distinctive color in the blue to blue-green color range. Coloring material shall be nonirritating to the skin and halide-free. Coloring may vary from a single stripe not less than 1-3/4 inches wide on each face to complete coloring of all surfaces. Coloring may be interrupted at intervals to imprint the manufacturer's name or trademark. Plywood sheets shall be color stained as required for planks and shall have the above plank designation indelibly marked on the back face near each end. In the event plywood markings are not easily legible due to surface roughness, lack of contrast between color stain and marking or other reasons, branding as for planking shall be employed on the back face.

3.14 Workmanship. Fire-retardant treated material shall meet the grade or type of lumber or plywood specified in the contract or order. In the special case where treatment is performed on Government-owned material, a prior agreement shall be made concerning the amount of degrade permitted (see 6.3.2).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by 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.

4.1.1 General. Unless otherwise specified, and except as modified or augmented below, the procedures of AWPA standards M2 and M3 shall be followed.

4.2 Classification of inspections. The inspection of requirements specified herein are classified as follows:

(a) Qualification inspection (see 4.3).
(b) Quality conformance inspection (see 4.4).

4.3 Qualification inspection. Qualification inspection shall be conducted at a laboratory satisfactory to NAVSEA (see 6.5) on sample units as specified herein. Qualification inspection shall consist of the examination of 4.5 and the tests of 4.6.

4.3.1 Qualification of treatment. Except as modified below, all fire retardant treatments shall be subjected to all of the tests and meet all of the requirements stated herein for each species of lumber or plywood. The tests as specified in 4.6.5.2 may be used in lieu of 4.6.5.1. Tests as specified in 4.6.1.2, 4.6.6, and 4.6.7 establish criteria for quality conformance tests and have no qualification test criteria. After qualification of a treatment applied to Southern Pine Sapwood, the tests as specified in 4.6.2 through 4.6.5 need not be repeated for any species treated with identical chemicals, except laminated veneer lumber. For this material each species or combination of species shall

be strength tested (see 4.6.2), but the fire test (see 4.6.1) need not be run for any species or combination of species previously qualified in the form of plywood. Each species to be qualified must be tested according to all requirements until such time as Southern Pine Sapwood lumber is qualified.

4.3.2 Sampling for qualification. Treated material for qualification testing shall be selected from a production run of lumber or plywood of each species to be qualified. Sufficient treated material and treating solution for required tests shall be selected from the same production run and shall be representative of the lot for rate of growth, density and location within the autoclave.

4.3.2.1 Sampling of unincised, untreated wood for strength tests. Untreated, unincised sections, cut from the same material as selected and treated for the strength tests, shall be utilized for the tests specified in 4.6.2. Material shall be of straight grain, uniform quality, and end-matched with treated samples.

4.3.2.2 Fire tube samples. Samples for the fire tube test (see 4.6.1.2) shall consist of 10 sticks, 3/8 by 3/4 by 48 inches, of the same material as being treated. Samples shall be precut and distributed symmetrically throughout the treating charge. An 8-inch length shall be cut from the end of five of the sticks for the tests as specified in 4.6.3 after normal treating and drying for the treatment process.

4.4 Quality conformance inspection. Quality conformance inspection shall consist of the examination as specified in 4.5 and the tests as specified in 4.6.1.2 and 4.6.6 through 4.6.8.

4.4.1 Lot. A sampling lot shall consist of all the material treated in a single charge.

4.4.2 Sampling for quality conformance. Sufficient samples of treated material and treating solution shall be selected from each lot for the tests specified in 4.4. Samples shall be selected to be representative of the lot for rate of growth, density and location within the autoclave. Fire tube samples may be cut in accordance with ASTM E 69, or precut as specified in 4.3.2.2. Random samples for visual examination (see 4.5) shall be as specified in table I.

TABLE I. Sampling procedure for inspection.

Number of pieces in charge	Number of pieces in sample	Acceptance number (defectives)	Rejection number (defectives)
40 under	2	0	1
41 to 65	3	0	1
66 to 110	5	0	1
111 to 300	7	1	2
301 to 800	10	1	2
801 to 3,200	15	1	3
3,201 to 8,000	25	3	4

4.5 Examination. Fire retardant treated lumber and plywood selected as specified in 4.4.2 shall be inspected to determine compliance with 3.2, 3.9 and 3.14. If any piece does not conform to these requirements it shall be considered defective and shall be cause for rejection. If the number of such pieces in any sample exceeds the acceptance number for that sample, each piece in the lot represented by the sample shall be checked by the contractor for the deficiency indicated, and all nonconforming pieces removed.

4.6 Methods of test.

4.6.1 Fire retardance.

4.6.1.1 Surface burning characteristics. Fire tests shall be conducted on treated lumber, plywood or laminated veneer lumber in accordance with the procedures of ASTM E 84. Test material shall remain in the test chamber for 30 minutes to determine compliance with 3.3.1. Three tests shall be made on material of the same lot and results shall be averaged. Flame spread values shall be computed relative to red oak lumber and asbestos millboard in accordance with ASTM E 84.

4.6.1.1.1 Type II material. Fire tests as specified in 4.6.1.1 shall be performed on material subjected to the accelerated weathering procedure in accordance with method A of ASTM D 2898.

4.6.1.2 Fire tube test. Fire tube tests, in accordance with ASTM E 69, shall be conducted on samples selected as specified in 4.3.2.2 or 4.4.2. The final percentage weight loss after flaming and glowing have ceased, and percentage moisture content of the specimens shall be determined and averaged. Ten samples shall be tested for qualifying the process and five tests shall be made for quality conformance testing. When 10 samples are tested, only five moisture content specimens are required and shall be cut from the ends of the sticks not used for samples as specified in 4.6.3.

4.6.2 Strength tests. Ten static bending tests shall be made on both the treated and unincised, untreated material retained as specified in 4.3.2 and 4.3.2.1. These tests shall be center-load tests conducted in accordance with the general provisions of ASTM D 143. Span to depth ratios of 14 to 1 shall be used. Test specimens shall be prepared from material 2 inches or less in thickness; two specimens each from five different boards within the lot. Each treated specimen shall contain at least one exposed treated face, and this face shall be so placed in the bending test that it will be stressed in tension. Both the unincised, untreated material and treated material shall be at an original moisture content of 20 ± 2 percent and then conditioned to constant weight equilibrium at 68 ± 6°F (20 ± 3°C) and 65 ± 1 percent relative humidity before test. The percent retention in average modulus of elasticity, modulus of rupture, and work to maximum load values for each treated specimens as compared to the matched unincised, untreated specimens shall be determined.

4.6.3 Hygroscopicity. An 8-inch length from the one end of five of the fire tube sticks (see 4.3.2.2) shall be oven dried to constant weight at 120 ± 4°F (49 ± 2°C and ambient humidity). The specimens, properly stickered shall then be exposed for 2 weeks at 77 ± 6°F (25 ± 3°C) and 80 ± 1 percent relative humidity. Specimens shall be observed for exuding of chemicals,

and weights taken to determine the moisture content (see 3.5). Specimens shall shall then be oven dried to constant weight of 217 ± 4°F (103 ± 2°C) to determine moisture content.

4.6.4 Acidity. A fully impregnated specimen of wood (see 4.3.2), shall be broken into small chips, using a planer, and finely ground in a Wiley mill with a 2 mil screen. A 10 gram sample of these chips shall be placed in 100 cubic centimeters (cm^3) of distilled water, which has been freshly boiled and cooled to room temperature 77 ± 4°F (25 ± 2°C) without contact with air. Determination of pH shall be made of the solution at 77 ± 4°F (25 ± 2°C) with glass-electrode pH measuring equipment until constant values are obtained. Agitation of the solution may be used to aid in obtaining equilibrium conditions. Care shall be taken throughout the test to prevent contamination of the solution sample with carbon dioxide from the air. The results of three determinations, made on separate extract solutions, shall be averaged.

4.6.5 Corrosiveness.

4.6.5.1 Extract sample solutions of 10 grams of fire-retardant-treated wood chips in 100 cm^3 of distilled water shall be prepared as specified in 4.6.4. The corrosion rate in mils per year for SAE 1010 steel, 85-15 red brass and bare 2024-T3 or 5154-0 aluminum alloy shall be determined in the sample solution at 77 ± 4°F (25 ± 2°C). Two duplicating runs shall be made with each of the materials.

4.6.5.1.1 Commercial instruments (corrosometer, Crest Instrument Co., or equivalent) are available to directly indicate corrosion rates in mils per year of metals in chemical solutions, based on changes in cross section and resistance of thin standard metallic elements. With these instruments there are often, during the initial period of immersion of the metallic element in the extract solution, some rapid changes and inconsistencies in the values obtained. Thereafter the rate is fairly constant. For the purpose of this specification, the rate shall be the constant rate obtained following the initial 100 hours of immersion. With such instruments, the constant rate of corrosiveness for the extract solutions can usually be obtained within 1 week.

4.6.5.2 The following procedure may be used as an alternate method to that specified in 4.6.5.1 for determining the corrosiveness of fire-retardant-treated wood. Test strips, 1 by 2 inches and 1/16-inch thick, of each of the three metals specified in 4.6.5.1, shall be used. Each of these metal strips shall be sandwiched between two nominally 1- by 1- by 2-inch pieces of fire-retardant treated wood from the qualifying charge, which have been exposed for 10 days in an atmosphere maintained at 120 ± 2°F (49 ± 1°C) and relative humidity of 90 ± 1 percent. The metal strips shall be cleaned, prior to use, with fine garnet sandpaper and washed with alcohol-acetone mixture to remove oil or grease. After washing and wiping dry, the metal strips shall be weighed to the nearest milligram. Clamping pressure shall be applied to the assembly to insure complete contact of the surfaces of the wood pieces and metal. Care shall be taken that the clamp does not involve the contact of dissimilar metals. The entire assembly shall be exposed to an atmosphere maintained at 120 ± 2°F (49 ± 1°C) and a relative humidity of 90 ± 1 percent for 10 days. Two assemblies with each of the metals shall be included. At the end of the exposure period the assembly shall be dismantled, the metal strips thoroughly washed under running water

and brushed lightly to remove loose corrosion products. The remaining corrosion products shall then be removed by immersion in one of the following reagents: Aluminum (10 water: 1 nitric acid), brass (3 water: 1 hydrochloric acid), and steel (10 percent ammonium citrate solution). The sample shall then be rinsed in water, dried, and reweighed to the nearest milligram. The corrosion rate in mils per year shall be computed from the weight loss using the following formula:

$$\text{Mils of corrosion per year} = \frac{2.227^{1/}\ (\text{the initial weight} - \text{the final weight})}{(\text{metal density})\qquad(\text{surface area})},$$

where the weights are expressed in milligrams and the surface area in square inches. The density used for the various metals shall be as follows:

Aluminum	2.70 grams per cm^3
Brass	8.40 grams per cm^3
Steel	7.80 grams per cm^3

4.6.6 Chemical penetration. Following the general procedures in accordance with AWPA M2, penetration shall be determined from 20 increment borings taken from at least six samples of lumber for each lot. Increment borings shall be taken on the larger area, within the center half of the length and width, of samples well distributed within the charge. Dyes may be used on the increment cores to aid in determining the depth of penetration. Measurements of the depth of penetration shall be made to the nearest 0.1 inch. Penetration of plywood shall be determined from the cross-sectional end and edge nearest the panel center, exposed as specified in 4.6.8. Boring shall not be permitted.

4.6.7 Solution concentration and chemical composition. A 1-quart representative sample of the treating solution shall be tested for concentration using an accurate hydrometer or other suitable method. A statement shall be rendered by the contractor, certifying that the ingredients of the chemical solution used in the treatment are identical in chemical types and proportions to those used in qualifying the treatment (see 3.14).

4.6.8 Moisture content determination of treated lumber and plywood. The oven drying method in accordance with ASTM D 2016 shall be used. Samples upon which moisture determinations are made shall be well distributed within the charge. For lumber, samples for moisture content determinations shall be taken 2 feet from the end on not less than six boards or timbers in a given lot. The average moisture content and the shell and core moisture distribution shall be determined. Average moisture content of the sample may be determined from a separate cross-sectional slice or may be calculated from the combined weights of the core and shell sections before and after oven drying. For plywood, samples for moisture content determinations shall be taken 8 inches back from the panel end and edge on not less than six panels well distributed in a given

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1/ The constant 2.227 converts the 10-day data to a yearly basis, assuming direct relation with time, and converts density to a gram per cubic inch basis.

lot. Moisture content samples shall be at least 2 by 4 inches by panel thickness. Plywood test samples may, at the option of the contractor, be obtained from small panels of the same species and thickness, at least 2 by 2 feet in size, which the contractor has furnished for this purpose. Such sample panels shall have been subjected to the treating and drying phases in such a manner that the test sample will be representative of the condition of all panels in the lot being tested. Where kiln drying is a required part of the process to achieve treatment effectiveness, assurance shall be made that necessary kiln time and temperature schedules are achieved but are not exceeded.

4.7 Toxicity. A manufacturer of material shall disclose the formulation of his product to the Naval Medical Command, MEDCOM 42, Washington, DC 20372. The disclosure of proprietary information, which shall be held in confidence by the Naval Medical Command, shall include: the name, formula, and approximate percentage by weight and volume of each ingredient in the product; the results of any toxicological testing of the product; identification of its pyrolysis products; and any such other information as may be needed to permit an accurate appraisal of any toxicity problem associated with the handling, storage, application, use, or disposal of the material.

4.8 Inspection of packaging. Sample packages and packs, and the inspection of the preservation-packaging, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

5. PACKAGING

(The preparation for delivery requirements specified herein apply only for direct Government acquisition.)

5.1 Preservation. Treated material shall be protected from the elements during shipment and storage.

5.2 Packing. Treated material shall be packaged in a manner which will insure acceptance by common carrier; at lowest rate, and will afford protection against physical or mechanical damage during direct shipment from the supply source to the using activity.

5.2.1 Specific unitizing. The method of unitizing and loading of treated material shall be in accordance with appropriate methods and levels as specified in MIL-L-14362, for lumber, and NN-P-530 for plywood (see 6.2.1).

5.3 Marking for identification.

5.3.1 Unit lot. Each unit lot shall be marked with the following:

(a) Chemical treatment designation, including the symbol FR or FR-X.
(b) Specification number.
(c) Gross weight.
(d) Contractor's name and address of plant which furnished the treatment.
(e) Date of treatment.

6. NOTES

6.1 Intended use. Material in accordance with this specification is intended for general construction, decorative and utility use where good resistance to surface flame spread is desired. Other factors concerning its end use, characteristics and marking are described below.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

(a) Title, number, and date of this specification.
(b) Type of treatment for lumber and plywood (see 1.2).
(c) Category of lumber based on use (see 1.2.2).
(d) Requirements relative to incising lumber (see 3.2.3.1).
(e) Omission of blue marking (type II) if end use dictates (see 3.9).
(f) Moisture content of material after treatment (see 3.12 and 6.3.3).
(g) When 3 foot interval marking is required (see 3.13.1).
(h) Marking requirements for individual pieces; that is category 1, (a) or (b) or both or category 2 (see 3.13.1, 3.13.2 and 6.4.5).
(i) Specific unitizing and loading instruction (optional (see 5.2.1)).
(j) Whether verification information is required (see 6.3.1).

6.3 Acquisition. Care should be taken to specify lumber or plywood of a species which has been qualified and listed on Qualified Products List - 19140 for this specification (see 6.5). It is essential that only plywood made with highly water-resistant adhesives be subjected to treatment. In general, softwood plywood of the exterior type and hardwood plywood of technical type or type I are suitable.

6.3.1 Verification. Verification information should be provided for each contract or order of treated lumber or plywood. The verification information should include results of the examination and tests specified herein, and a comparison of these results with qualification test values. It should also include a certification by the treating facility pertaining to the ingredients of the chemical solution as specified in 4.6.7. The certification should include a statement as to the frequency of analyses and the date of the most recent chemical analysis of the solution. This information should be provided to the contracting activity and to the end user activity.

6.3.1.1 The requirements herein do not preclude the additional requirement in the contract or order for each piece to show the mark or label of an independent testing agency, fire performance rating or suitability for weather exposure.

6.3.2 Workmanship. The treating and redrying of lumber and plywood almost always results in some degrade depending on the skill and care of the plant operator. When possible, fire-retardant treated material should be ordered by grade. The contractor will furnish material meeting that grade. In the case where Government-owned material is sent to a plant for treatment, a prior agreement should be made concerning the amount of degrade permitted. It is unrealistic to assume that no degrade will occur; and uneconomical to accept unlimited degrade by assuming that it cannot be controlled.

6.3.3 Moisture content. The moisture content limitations as specified in 3.12 are for general purpose applications. Where specified end uses require different limitations they should be specified in the contract or order.

6.3.4 General information. Most often it is unnecessary to treat timbers greater than 6 by 6 inches in cross-section for added fire-retardance. Square dimensions over this size have considerable resistance to burning when exposed to usual fire conditions and will usually remain structurally effective after supporting metal structural components have collapsed. Lumber over 3 inches in thickness is difficult to dry properly in a short period of time. Also, lumber over 3 inches in thickness is difficult to impregnate thoroughly; that is, the central portion is not penetrated by the fire-retardant chemical. Considerable savings can often be made and adequate protection acquired by sheathing the outside of an untreated timber with thoroughly impregnated lumber or plywood of lesser dimension.

6.4 Fire-retardant treatment.

6.4.1 This specification does not apply to lumber or plywood made noninflammable by the application of surface coatings or to veneers or boards impregnated with fire-retardant chemicals and glued into plywood or laminates.

6.4.2 Type I treated material is intended for use only where it will not be subjected to wetting and where the relative humidity will not exceed 80 percent. Material can be painted or stained but care must be taken to assure that the wood is thoroughly dry and will not be exposed to further dampness due to the hygroscopic nature of chemical salts used in the treating solution.

6.4.3 Type II treated material is intended for use where it may be exposed to the weather or high humidities. It may be used indoors or outdoors and may be painted or stained as untreated wood.

CAUTION: Resurfacing or ripping lumber (other than ordinary end cutting) may invalidate the testing agency label in regards to fire hazard classification and performance rating. Care should be taken to ensure that fire retardant treated (FRT) lumber is ordered in the size to be used as much as possible.

6.4.4 Design stress reduction. The National Design Specifications for stress grade lumber and its fastenings recommends that the design value for interior fire-retardant pressure treated wood be reduced 10 percent.

6.4.5 Marking categories. It is intended that category 1 marking be used in most cases and some choice is allowed in the type and amount of marking required. The use of FR or FR-X is expected to appear on each piece as generic standard designator for type I and type II treatments. The category 2 marking is a special type for use by Naval and contractor shipyards on scaffold plank and plywood to be used in and around Naval ships. It may be specified for type II treatments for other sizes or types of wood material or for other uses if desired.

6.5 With respect to products requiring qualification, awards will be made only for products which are, at the time set for opening of bids, qualified for inclusion in Qualified Products List QPL-19140 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362 and information pertaining to qualification of products may be obtained from that activity. Application for qualification tests shall be made in accordance with "Provisions Governing Qualification SD-6" (see 6.5.1).

6.5.1 Copies of "Provisions Governing Qualification SD-6" may be obtained upon application to Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

6.6 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:
Army - ME
Navy - SH

Review activities:
Navy - YD
DLA - CS

Preparing activity:
Navy - SH
(Project 5510-0161)

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-L-19140E	LUMBER AND PLYWOOD, FIRE-RETARDANT TREATED

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
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