



# Standard Specification for Design, Fabrication, and Installation of Fences Constructed of Wood and Related Materials<sup>1</sup>

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*This standard has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.*

## 1. Scope

1.1 This specification covers all wood fences, including fences combined with wood and other materials.

1.2 This specification covers three classifications of wood fences. This specification is based on fundamental construction principles combined with long-standing traditional fence building skills, and covers the design, fabrication, and installation practices of wood fences.

1.3 This specification also provides a systematic method of purchase, inspection with basis for rejection, and certification of manufactured wood fences by the fence industry.

1.4 The values stated in inch-pound units are to be regarded as the standard. Acceptable industry-wide SI equivalents are being developed.

## 2. Referenced Documents

### 2.1 ASTM Standards:

- A 641 Specification for Zinc-Coated (Galvanized) Carbon Steel Wire<sup>2</sup>
- A 809 Specification for Aluminum-Coated (Aluminized) Carbon Steel Wire<sup>2</sup>
- B 221 Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes<sup>3</sup>
- D 2605 Specification for Volatile Petroleum Solvent (LPG) for Preparing Pentachlorophenol Solutions<sup>4</sup>
- D 3225 Specification for Low-Boiling Hydrocarbon Solvent for Oil-Borne Preservatives<sup>4</sup>
- D 3506 Specification for Inhibited Grade Methylene Chloride for Preparing Pentachlorophenol Solutions<sup>4</sup>
- F 669 Specification for Strength Requirements of Metal Posts and Rails for Industrial Chain Link Fence<sup>2</sup>
- F 1222 Classification for Hardware for Wood Fencing<sup>2</sup>
- F 1234 Specification for Protective Coatings on Steel Framework for Fences<sup>2</sup>

### 2.2 Federal Standards:

FF-N-105B Specification for Nails, Brads, Staples, and Spikes: Wire, Cut, and Wrought<sup>5</sup>

TT-W-572B Wood Preservative: Water Repellent<sup>5</sup>

2.3 *Canadian Standards Association Document:*

B 111-74 Specification for Wire Nails, Spikes, and Staples<sup>6</sup>

2.4 *National Forest Products Association Standard:*

National Design Specification for Stress Grade Lumber and Its Fastenings<sup>7</sup>

2.5 *Voluntary Product Standards:*

PS 20-70 Softwood Lumber<sup>8</sup>

PS 1-74 Softwood Plywood<sup>8</sup>

2.6 *American Plywood Association Standard:*

Specification for Plywood Design<sup>9</sup>

2.7 *American Wood Preservers Association Standards:*

C 1 All Timber Products, Preservative Treatment by Pressure Process<sup>10</sup>

C 2 Lumber, Timbers, Bridge Ties, Mine Ties, Preservative Treatment by Pressure Process<sup>10</sup>

C 5 Fence Post, Preservative Treatment by Pressure Process<sup>10</sup>

C 9 Plywood, Preservative Treatment by Pressure Process<sup>10</sup>

C 16 Wood Used on Farms, Preservative Treatment by Pressure Process<sup>10</sup>

C 23 Round Poles and Posts Used For Building Construction, Preservative Treatment by Pressure Process<sup>10</sup>

M 4 Care of Pressure Treated Wood Products<sup>10</sup>

## 3. Terminology

### 3.1 Definitions:

3.1.1 *back rails*—rails on which cover material is directly attached.

<sup>5</sup> Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

<sup>6</sup> Available from Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario, Canada M9W 1R3.

<sup>7</sup> Available from National Forest Products Association, 1619 Massachusetts Ave., N.W., Washington, DC 20036.

<sup>8</sup> Available from U.S. Department of Commerce, National Bureau of Standards, Washington, DC 20234.

<sup>9</sup> Available from American Plywood Association, 1119 A St., Tacoma, WA 98401.

<sup>10</sup> Available from American Wood Preservers Association, P.O. Box 849, Stevensville, MD 21666.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 01.06.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 02.02.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 04.09.

3.1.2 *boards*—lumber that is up to 1 in. in nominal thickness and 2 in. or wider in nominal width.

3.1.3 *cover material*—the face or fill material attached to a fence structural frame.

3.1.4 *custom fence design*—any fence design that is significantly different from those described in this specification. Custom fence designs are also required to meet all requirements regarding materials, fabrication, installation, workmanship, and structural equivalency as set forth within this specification.

3.1.5 *panel products*—all modular products available in standardized rectangular panels, many of which are suited to exterior applications such as privacy fencing. Examples are plywood, fiberglass, and corrugated metals.

3.1.6 *pickets*—narrow wood members that are sawn, split, sliced, milled, natural round or half-round, and are approximately 2 to 4 in. in face or coverage width.

3.1.7 *posts*—the vertical structural support members of the fence frame.

3.1.8 *rails*—the horizontal structural support members of the fence frame.

3.1.9 *slats or weave boards*—the horizontal or vertical members used in basket-weave type fences normally  $\frac{3}{8}$  to  $\frac{3}{4}$  in. thick and 3 in. or wider in nominal width.

3.1.10 *standard fence design*—any fence structural frame or fence-type classification covered within this specification.

#### 3.2 Descriptions of Terms Specific to This Standard:

3.2.1 *boards or pickets*—fence boards or pickets are specified by the desired shape or manufacture of the upright end when installed vertically as described in 3.2.2 through 3.2.9.

3.2.2 *California clipped corners*—corners similar to 3.2.8, except the clip angle is steeper at approximately 65°.

3.2.3 *diamond point*—a board or picket similar to the standard point (3.2.9), except it consists of additional angular cuts, front and back, so that the top appears as a triangle from four angles of view, or pyramid shaped.

3.2.4 *flattop*—a simple flat or 90° square cut end.

3.2.5 *gothic*—a picket or board in which the shape is formed by two arc-shaped cuts that meet at center to form a graceful point at the top.

3.2.6 *handsplit*—pickets, posts, and rails which are split by machine or by hand using an axe or froe, etc.

3.2.7 *pencil point*—a picket or board that is conical in shape, and common to round and half-round pickets.

3.2.8 *standard clipped corners (or dog-eared corners)*—corners which are clipped diagonally (approximately 45°).

3.2.9 *standard point*—a picket or fence board cut to a point at approximately 45° angles.

3.2.10 *posts*—fence posts are specified by the desired shape or manufacture of their above ground tops as described in 3.2.11 through 3.2.15.

3.2.11 *chamfered posts*—in round or square posts, the shallow diagonal cut or easing of the otherwise square-cut end. Usually measures from  $\frac{3}{4}$  to 1½ in. along the chamfer.

3.2.12 *diamond-point posts*—the pyramid-shaped ends of post which are formed by angle cuts of approximately 45°.

3.2.13 *domed posts*—rounded ends of either round or square posts.

3.2.14 *flattop fence posts*—the square cut ends of post.

3.2.15 *pencil-point posts*—conically shaped round post tops.

## 4. Classification of Standard Fence Types

4.1 The generic classifications of wood fencing in 4.2 through 4.5 have gained common recognition throughout the fence industry and are adapted to this specification as a means of identifying a basic fence type. These classifications may be used in all cases as part of the purchase agreement between buyers and sellers of wood fencing; except a detailed description, drawing, or rendering of a custom fence design may be substituted where necessary.

### 4.2 Type I—Rail Fences:

4.2.1 *Split Rail*—The common country fence of alternating layers of handsplit rails laid up in zigzag tiers.

4.2.2 *Split or Sawn Post and Rail, or Both*—The rustic fence made up of split or sawn rails (two to four rails) installed into slotted split or sawn posts.

4.2.3 *Round Post and Rail*—A fence similar to that described in 4.2.2, except posts and rails are round or natural shaped; normally produced in two, three, and four rail fences. The rails are machined at ends to form a paddle-shaped scarf joint to be installed into post slots or formed into doweled ends for installing into posts with round connections.

4.2.3.1 *Herringbone Pattern Round Post and Rail*—A fence as described in 4.2.3, except it is normally a three-rail fence with small round wood inserts (doweled) which are installed between the upper two rails to form the familiar herringbone pattern.

4.2.3.2 *English Hurdle Fence*—A standard post and rail fence as described in 4.2.2 and 4.2.3, except that two smaller rails are installed diagonally from the fence posts (usually below the bottom rail connection) extending upwards to just above the fence top rail where they intersect and join a third decorative rail of the same approximate size, which extends downward to just below the bottom rail at a perpendicular angle.

4.2.4 *Post and Board*—The fence often referred to as corral fence is normally constructed using sawn wood posts, although round wood posts are sometimes used, with boards serving as rails. They are commonly constructed in two, three, or four board configurations.

4.2.4.1 *Crossbuck Post and Board*—A fence as described in 4.2.4, except that two boards diagonally cross each other between two standard top and bottom board rails.

4.2.4.2 *Crossbuck Post and Rail*—A fence as in 4.2.4.1, except rails are 2-in. or thicker nominal lumber.

4.2.4.3 *Hurdle Post and Board*—A fence having the same geometric arrangement as the English hurdle fence in 4.2.3.2, except all rails are sawn boards.

4.2.4.4 *Hurdle Post and Rail*—A fence as described in 4.2.4.3, except top and bottom rails are 2 in. or thicker nominal lumber.

4.3 *Type II—Board Fences*: Every design within this type may be supported by sawn wood posts, round wood posts, or metal posts.

4.3.1 *Solid Board Fence*—A fence that is constructed of

ordinary wood fence boards which are usually installed vertically, but occasionally horizontally or diagonally, over a rather conventional fence frame of from two to four rails between posts.

4.3.2 *Spaced Board Fence*—A fence as described in 4.3.1, except that open space is provided between the boards either for eye appeal or for ventilation.

4.3.3 *Shadow Box*—A fence that is constructed like a solid board fence (see 4.3.1), except that fence boards are installed alternately from one side of the fence rails to the other, providing interesting shadow lines as well as excellent ventilation. This fence is commonly offered in either vertical or horizontal panels.

4.3.4 *Louver*—A fence which is similar to common board fences (4.3.1) in frame configuration, except that fence boards are installed angularly between the fence rails with the effect of directing sunlight and air in a desirable way. These fences may be constructed with the board louvers installed vertically or horizontally.

4.3.5 *Weave*—A fence similar to the shadow box (4.3.3), except each individual fence board, normally 1 in. nominal in thickness, is alternately attached to one side of the top rail and the opposite side of the bottom rail. It may be constructed vertically as described, or horizontally (minus rails) by alternating installation of the boards directly to the fence posts.

4.3.6 *Basket Weave*—A fence similar to the weave (4.3.5), except basket boards (commonly  $\frac{3}{8}$  to  $\frac{3}{4}$  in. in thickness) are woven alternately between from one to five small wood members (sometimes 1 by 2, 1 by 3, or 1 by 4-in. nominal), which extend through the height of the weave perpendicularly. The fence may contain either a vertical or horizontal weave, but in either form, the top and bottom rails may be required for rigidity. The basket weave fence requires high quality wood because of its relative thinness.

4.4 *Type III—Picket Fences*: Every design within this type may be supported by sawn wood posts, round wood posts, or metal posts.

4.4.1 *Sawn Picket*—A fence in which the pickets are from 2 to 4-in. nominal width and are installed vertically. The pickets may be installed over two to four back rails of sawn lumber. The pickets may be installed solid or by specified spacing where desired for light and ventilation.

4.4.2 *Grape Stake Picket*—A fence that is sometimes referred to by the picket type, either handsplit or machine sliced. This is a popular fence in the durable species and is usually constructed with handsplit or machined back rails and posts. It is most often installed with solid picket cover, but can be utilized as a spaced picket fence.

4.4.3 *Stockade Picket*—A fence that is similar to other picket fences, except the pickets are natural, machine milled, round, or sliced to half-round; and are available with bark removed, or with bark on for an added rustic effect. This fence is popular in common wood species, and may be installed to round wood posts and round or half-round back rails, sawn posts, and back rails; or back rails attached to metal posts.

4.4.4 *Wire-Bound Picket*—This fencing is wire-bound, wooden picket fencing, in roll form. It is used for applications such as but not limited to, snow, shade, safety, sand, and

screening. The fence is fabricated with a 2- or 4-in. maximum spacing between pickets as specified by the purchaser. Each picket is held firmly by five pairs of zinc-coated wires. Each pair of wires is tightly twisted by rotating a twister head a minimum of  $2\frac{1}{2}$  complete revolutions ( $900^\circ$  of rotation) for 2-in. spacing and 5 complete revolutions ( $1800^\circ$  of rotation) for the 4-in. spacing.

4.4.4.1 The twist rotation shall be in opposite directions between each succeeding picket. The wire shall have a minimum coated diameter of 0.099 in. (12½ gage) and a minimum zinc coating of 0.30 oz/ft<sup>2</sup> (Specification A 641, Class 1) or a minimum aluminum coating of 0.32 oz/ft<sup>2</sup> (Specification A 809) as selected by the purchaser. It shall have a minimum tensile strength of 70 000 psi in accordance with Specification A 641 or Specification A 809, Medium Temper. The wire spacing of top and bottom pairs of wires shall be not less than 3 in. and not more than 6 in. from the ends of the pickets, with the remaining pairs of wires spaced equidistant between the top and bottom wires.

4.4.4.2 The length of roll of fabricated fence shall be 50 ft  $\pm$  6 in. The pickets shall be made of spruce, hemlock, cedar, redwood, fir, or pine, air-dried and rough sawn. The pickets may be stained, painted with a red oxide coating, or pressure-treated in accordance with 9.4 as specified. Picket dimension shall be: length, either 48 or 72  $\pm$   $\frac{3}{16}$  in.; width,  $1\frac{1}{2} \pm \frac{1}{16}$  in.; and thickness,  $\frac{3}{8} \pm \frac{1}{16}$  in.

#### 4.5 *Type IV—Solid Panel Fences*:

Every design within this type may be supported by sawn wood posts, round wood posts, or metal posts.

4.5.1 *Plywood Panel Fences*—A fence which includes any common post and back rail construction with an exterior grade of plywood that is installed on or within the frame.

4.5.2 *Other Panel Product Fences*—Other panel products suitable for exterior use and manufactured in standard panel sizes may be installed within any fence frame that provides adequate lateral support for the panel. Examples include corrugated fiberglass and corrugated metals.

### 5. Ordering Information

5.1 Complete information describing the desired fence product shall be provided with all purchase orders or inquiries. The information described in 5.1.1 through 5.1.11 shall be included as detailed within this specification:

5.1.1 *Fence-Type Classification or Description*—Provide the standard fence-type classification, as described in Section 4, or substitute a detailed description, drawing, or architectural rendering, depending on the complexity of a custom design, and the requirements of the fence supplier.

5.1.2 *Structural Frame Identification Number*—Provide the fence structural frame identification index number as provided in Tables 1-3 (see also Section 7). Also, specify the maximum post spacing in feet, center to center of posts and the height of the fence, which is the minimum measurement from ground level to the top of the cover material or top of the top rail, whichever is the greater when options are provided for a particular fence frame in the tables. For open post and rail fences, specify the desired number of rails where shown to be optional in Table 1. The fence frames listed in Tables 1-3 and Section 7 provide many common fence frame configurations

**TABLE 1 Open Frame Post and Rail Fences**

Fence Type Classification	Structural Frame Identification Index	Nominal Post Size, in.	Nominal Top Rail Size, in.	Nominal Center Rail(s), in.	Nominal Bottom Rail Size, in.	Post Spacings, ft	Above Ground Height of Fence, ft	Total Number of Rails per Section
Split post and rail	No. 1	3 ½ by 3 ½	1 ½ by 1 ½	...	1 ½ by 1 ½	6	3	2
	No. 2	4 by 4	2 by 3	...	2 by 3	8	4	2
	No. 3	4 by 4	2 by 3	2 by 3	2 by 3	8	4	3
	No. 4	4 by 5	2 by 4	...	2 by 4	10	5	2
	No. 5	4 by 5	2 by 4	2 by 4	2 by 4	10	5	3
	No. 6	5 by 5	2 by 3	2 by 3	2 by 3	8	6	3
	No. 7	5 by 5	2 by 4	...	2 by 4	10	6	2
	No. 8	5 by 5	2 by 4	2 by 4	2 by 4	10	6	3
Round post and rail	No. 9	4 diameter	...	3 diameter	...	8	1, 2	1
	No. 10	5 diameter	...	4 diameter	...	8 to 10	1, 2	1
	No. 11	4 diameter	3 diameter	...	3 diameter	8	2, 3, 4	2
	No. 12	4 diameter	3 diameter	3 diameter	3 diameter	8	3, 4, 5	3
	No. 13	5 diameter	4 diameter	...	4 diameter	8 to 10	3, 4, 5	2
	No. 14	5 diameter	4 diameter	4 diameter	4 diameter	8 to 10	4, 5, 6	3
	No. 15	5 diameter	4 diameter	4 diameter	4 diameter	8 to 10	5, 6, 7	4
Sawn post and board	No. 16	3 by 4	1 by 4	...	1 by 4	8	2	2
	No. 17	4 by 4	1 by 4	1 by 4	1 by 4	8	3, 4, 5	3, 4, 5
	No. 18	4 by 4	1 by 6	1 by 6	1 by 6	8	4, 5, 6	3, 4, 5

**TABLE 2 Sawn Wood Fence Frames**

Fence Type Classification	Structural Frame Identification Index	Nominal Post Size, in.	Nominal Top Rail Size, in.	Nominal Center Rail(s), in.	Nominal Bottom Rail Size, in.	Post Spacings, ft.	Above Ground Height of Fence, ft	Total Number of Rails per Section
Fence frames for use with cover materials (up to and including solid, 100% cover or fill designs)	No. 19	3 by 4	2 by 3	...	2 by 3	6	3, 4	2
	No. 20	4 by 4	2 by 3	...	2 by 3	8	3, 4	2
	No. 21	4 by 4	2 by 3	2 by 3	2 by 3	8	4, 5, 6	3
	No. 22	4 by 4	2 by 4	...	2 by 4	8	4, 5, 6	2
	No. 23	4 by 4	2 by 4	2 by 4	2 by 4	8	6	3
	No. 24	4 by 4	2 by 6	...	2 by 6	8	6	2
	No. 25	4 by 4	4 by 4	...	4 by 4	8	6	2
	No. 26	4 by 6	2 by 4	2 by 4	2 by 4	6	7	3
	No. 27	4 by 6	2 by 6	...	2 by 6	6	7	2
	No. 28	4 by 6	4 by 4	...	4 by 4	6	7	2
	No. 29	6 by 6	2 by 6	2 by 6	2 by 6	6	8	3
	No. 30	6 by 6	4 by 4	4 by 4	4 by 4	6	8	3
	No. 31	6 by 6	2 by 4	2 by 4	2 by 4	6	8	4
	No. 19A	3 by 4	1 by 4	...	1 by 4	6	3	2
	No. 20A	3 by 4	1 by 4	1 by 4	1 by 4	6	4, 5	3
	No. 21A	4 by 4	1 by 4	1 by 4	1 by 4	8	4, 5, 6	3

and may be used for simplified specifying. Alternatively, fence frames of significantly different design may be used if they provide structural integrity equal or superior to those described in Section 7, or if justified by structural engineering as provided in NFPA Specification for Stress Grade Lumber and Its Fastenings and APA Specification for Plywood Design.

**5.1.3 Architectural Class or Grade of Materials**—Include the architectural class of all sawn posts, rails, or boards as provided in Section 6 or their acceptable equivalent commercial lumber grade as provided in Tables 4-7. If handsplit, machine-sliced, or sawn pickets are to be used, specify the architectural class in accordance with Section 6. All other wood products are required to meet their minimum quality standards as established within Section 6.

**5.1.4 Species of Wood**—It is normally desirable for the

fence purchaser to specify the commercial species of wood to be used in the fence or its various component parts, as it relates vitally to the appearance, durability, and general performance of the fence structure (see Section 8).

**5.1.5 Preservative Pressure Treatment**—Specify the pressure treatment, where applicable, in accordance with AWPA Standards C 1, C 2, C 5, C 9, C 16, C 23, and M 4 (see Section 9).

**5.1.6 Sizes and Details for Cover Material(s)**—Sizes of boards, pickets, and other fence cover materials (such as basketweave stock) shall be included in all purchase orders and inquiries. Unless otherwise noted, all fence boards shall be taken to be 1 in. rough nominal in thickness. Details of cover material selection should be included where necessary (for example, nominal face widths of fence boards or pickets

**TABLE 3 Metal Fence Posts and Frames**

Fence Type Classification	Structural Frame Identification Index	Nominal Outside Diameter or Dimensions of Metal Posts, in.	Nominal Top Rail Size-Wood, in.	Nominal Center Rail-Wood, in.	Nominal Bottom Rail-Wood, in.	Post Spacings, ft	Above Ground Height of Fence, ft	Total Number of Rails per Section
Metal/wood fence frames for use with cover materials (galvanized steel pipe)	No. 1M	1.90	2 by 3	...	2 by 3	8	3 to 4	2
	No. 2M	1.90	2 by 3	2 by 3	2 by 3	8	4 to 5	3
	No. 3M	1.90	2 by 4	...	2 by 4	8	4 to 5	2
	No. 4M	2.375	2 by 3	2 by 3	2 by 3	8	4, 5, 6	3
	No. 5M	2.375	2 by 4	...	2 by 4	8	4, 5, 6	2
	No. 6M	2.375	2 by 4	2 by 4	2 by 4	8	5 to 6	3
Same usage as above but post and rails are metal channels	No. 7M	1.875 by 1.625	2 by 3	2 by 3	2 by 3	8	3 to 4	2
	No. 8M	1.875 by 1.625	2 by 3	...	2 by 3	8	4 to 5	3
	No. 9M	1.875 by 1.625	2 by 4	2 by 4	2 by 4	8	4 to 5	2
	No. 10M	2.25 by 1.70	2 by 3	2 by 3	2 by 3	8	4, 5, 6	3
	No. 11M	2.25 by 1.70	2 by 4	...	2 by 4	8	4, 5, 6	2
	No. 12M	2.25 by 1.70	2 by 4	2 by 4	2 by 4	8	5 to 6	3
	No. 13M	2.375 × 2 aluminum	2.375 × 2 aluminum	...	2.375 × 2 aluminum	6 to 10	3 to 6	2
	No. 14M	2.375 × 2 galvanized steel	2.375 × 2 galvanized steel	...	2.375 × 2 galvanized steel	6 to 10	3 to 6	2

**TABLE 4 Lumber for Fence Boards (2 in. and Wider)**

Species	Architectural Class I	Architectural Class II	Architectural Class III	Grade Rule Writing Agencies <sup>A</sup>
Western Red Cedar	select	quality	utility	ICA
Western Cedars (Incense and Red)	select	quality	utility	NLGA
	select merchantable	standard/construction	utility	WCLIB, WWPA, NLGA
Cypress	2 and btr common	3 common	4 common	WWPA, NLGA
Douglas Fir-Larch	1 common	2 common	3 common or peck	SCMA, NHLA
Douglas Fir-Larch	select merchantable	standard/construction	utility	WCLIB, WWPA, NLGA
Hem-Fir (Hemlock-White Fir)	2 and btr common	3 common	4 common	WWPA, NLGA
Hem-Fir (Hemlock-White Fir)	select merchantable	standard/construction	utility	WCLIB, WWPA, NLGA
Hem-Fir (Hemlock-White Fir)	2 and btr common	3 common	4 common	WWPA, NLGA
Western or Idaho White Pine	sterling	standard	utility	WWPA, NLGA
Western Pines	2 and btr common	3 common	4 common	WWPA, NLGA
Norway Pine	premium	premium	standard	NELMA
Eastern White Pine	premium	premium	standard	NELMA
Eastern White Pine	2 and btr common	3 common	4 common	NLGA
Northern Pine and Norway Pine (NHPMA)	2 and btr common	3 common	4 common	NHPMA, NELMA, NLGA
Southern Pine	No. 1 boards	No. 2 boards	No. 3 boards	SPIB
Eastern Hemlock and Tamarack	2 and btr common	3 common	4 common	NHPMA, NELMA
Aspen-Alder	2 and btr common	3 common	4 common	NHPMA, NELMA, NLGA, WWPA
Balsam Fir and Eastern Spruce	2 and btr common	3 common	4 common	NHPMA, NELMA, NLGA
Englemann Spruce	2 and btr common	3 common	4 common	WWPA
Sitka Spruce	select merchantable	standard/construction	utility	WCLIB, NLGA
Spruce-Pine-Fir	2 and btr common	3 common	4 common	NLGA
Redwood	select heart or select	construction heart or construction common	merchantable	RIS
Redwood				RIS
Northern White Cedar	2 and btr common	3 common	4 common	NELMA, NLGA
Alpine Fir	2 and btr common	3 common	4 common	WWPA, NLGA
All hardwoods	No. 1 construction	No. 2 construction	No. 3 construction	NLHA, SHLMA

<sup>A</sup> For identification of agencies, refer to Appendix X2.

should be specified, including the style in which they are laid-up). Sizes are provided in Section 10.

5.1.7 *Manufacture*—Special shapes or dressed ends of vertical fence boards, pickets, or posts shall be specified by the terminology provided in Section 3. Round post and rail fences may be specified with paddle-shaped scarf joints in cases where rail scarfs are fitted into slotted posts; or rails may be manufactured with doveled ends for installation into posts with special round-hold connections. Other special manufacturing details may be specified by including a detailed description, drawing, or rendering of the fence.

5.1.8 *Post Embedment*—The required fence post installation shall be specified as compact soil embedment, gravel or sand-gravel embedment, or set in concrete collar footings in accordance with Section 11. However, if the fence is installed by the purchaser, only the required post length need be specified, based on the depth of embedment as determined in accordance with Section 11.

5.1.9 *Fastenings and Connections*—This aspect of fence construction may be specified with considerable detail or may be omitted, in which case all fastenings and connections shall comply with Section 11.

TABLE 5 Lumber for Posts and Rails (2 to 4 in. Thick and 2 to 4 in. Wide)

Species	Architectural Class I	Architectural Class II	Architectural Class III	Grade Rule Writing Agencies <sup>A</sup>
Western Red Cedar	select	quality	utility	ICA
Western Cedars (Incense and Red)	construction/No. 2	standard, No. 3, or stud	utility	WWPA, WCLIB, NLGA
Cypress	1 common	2 common	3 common	SCMA, NHLA
Douglas Fir-Larch	construction/No. 2	standard, No. 3, or stud	utility	WWPA, WCLIB, NLGA
Hemlock-Fir	construction/No. 2	standard, No. 3, or stud	utility	WWPA, WCLIB, NLGA
Western Pine	construction/No. 2	standard, No. 3, or stud	utility	WWPA, NLGA
Eastern White Pine	construction/No. 2	standard, No. 3, or stud	utility	NELMA, NHPMA, NLGA
Western or Idaho White Pine	construction/No. 2	standard, No. 3, or stud	utility	WWPA, NLGA
Northern Pine	construction/No. 2	standard, No. 3, or stud	utility	NELMA, NHPMA, NLGA
Southern Pine	construction/No. 2	standard, No. 3, or stud	utility	SPIB
Eastern Hemlock, Tamarack	construction/No. 2	standard, No. 3, or stud	utility	NELMA, NHPMA
Aspen-Alder	construction/No. 2	standard, No. 3, or stud	utility	NELMA, NHPMA, NLGA
Balsam Fir, Eastern Spruce	construction/No. 2	standard, No. 3, or stud	utility	NELMA, NHPMA, NLGA
Engelmann Spruce	construction/No. 2	standard, No. 3, or stud	utility	WWPA
Sitka Spruce	construction/No. 2	standard, No. 3, or stud	utility	WCLIB, NLGA
Spruce, Pine, Fir	construction/No. 2	standard, No. 3, or stud	utility	NLGA
Redwood	select, select heart, or No. 2 open grain	construction common, construction heart, or No. 3 open grain, standard stud	merchantable utility	RIS
Alpine Fir	construction/No. 2	standard, No. 3, or stud	utility	WWPA, NLGA
All hardwoods	No. 1 dimension	No. 1 dimension	No. 2 dimension	NHLA, SHLMA
Northern White Cedar	construction/No. 2	standard, No. 3, or stud	utility	NELMA, NLGA

<sup>A</sup> For identification of agencies, refer to Appendix X2.

TABLE 6 Lumber for Posts and Rails (2 to 4 in. Thick and 6 in. and Wider)

Species	Architectural Class I	Architectural Class II	Architectural Class III	Grade Rule Writing Agencies <sup>A</sup>
Western Red Cedar	select	quality	utility	ICA
Western Cedars (Incense and Red)	No. 1	No. 2	No. 3	WWPA, WCLIB, NLGA
Cypress	1 common	2 common	3 common	SCMA, NHLA
Douglas Fir-Larch	No. 1	No. 2	No. 3	WWPA, WCLIB, NLGA
Hemlock-Fir	No. 1	No. 2	No. 3	WWPA, WCLIB, NLGA
Western Pine	No. 1	No. 2	No. 3	WWPA, NLGA
Eastern White Pine	No. 1	No. 2	No. 3	NELMA, NHPMA, NLGA
Western or Idaho White Pine	No. 1	No. 2	No. 3	WWPA, NLGA
Northern Pines	No. 1	No. 2	No. 3	NELMA, NHPMA, NLGA
Southern Pine	No. 1	No. 2	No. 3	SPIB
Eastern Hemlock, Tamarack	No. 1	No. 2	No. 3	NELMA, NHPMA
Aspen-Alder	No. 1	No. 2	No. 3	NELMA, NHPMA, WWPA, NLGA
Balsam Fir, Eastern Spruce	No. 1	No. 2	No. 3	NELMA, NHPMA, NLGA
Engelmann Spruce	No. 1	No. 2	No. 3	WWPA
Sitka Spruce	No. 1	No. 2	No. 3	WCLIB, NLGA
Spruce, Pine, Fir	No. 1	No. 2	No. 3	NLGA
Redwood	No. 1 open grain, select/select heart	No. 2 open grain, construction common/construction heart	No. 3 open grain, merchantable	RIS
Northern White Cedar	No. 1	No. 2	No. 3	NELMA, NLGA
Alpine Fir	No. 1	No. 2	No. 3	WWPA, NLGA
All hardwoods	No. 1 dimension	No. 1 dimension	No. 2 dimension	NHLA, SHLMA

<sup>A</sup> For identification of agencies, refer to Appendix X2.

5.1.10 *Finish*—When and if a special finish is desired, the color, method of application, and number of coats shall be specified (see Section 12).

5.1.11 *Gate Hardware*— When it is necessary to specify details concerning wood gate hardware or to order hardware for a given wood fence application, the terminology and classification system of Classification F 1222 shall be used.

**6. Quality of Materials of Manufacture**

6.1 *Quality Classification of Sawn Posts and Rails*—The following quality classifications of sawn lumber posts and rails may be achieved by ripping or cross cutting commercial grades of lumber to meet the requirements as listed. Compliance can

also be achieved by using the minimum commercial grades of lumber which are acceptable alternatives and in reasonable accordance with these architectural quality classifications. Tables 4-7 relate commercial lumber grades by size and use categories to the following fence industry component-part quality classifications:

6.1.1 *Architectural Class I, Sawn Posts and Rails*—This classification is recommended where the highest combination of both strength and appearance is required. Allowable growth characteristics and limiting provisions are described in 6.1.1.1 through 6.1.1.7.

6.1.1.1 Stained sapwood allowed, stained heartwood in 25 % of the piece.