

## Variations in Natural Wood Products

Wood is a natural material, with variations in color, texture, and figure. These variations are influenced by the natural growing process and are uncontrollable by the manufacturer. The color of wood within a tree varies between the "sapwood" (the outer layers of the tree that continue to transport sap) which is usually lighter in color, and the "heartwood" (the inner layers in which the cells have become filled with natural deposits). Various species produce different grain patterns (figures), which influence the selection process. There will be variations of grain patterns within any selected species. The manufacturer cannot select solid lumber cuttings within a species by grain and color in the same manner in which veneers may be selected. Therefore, color, texture, and grain variations will occur in the finest architectural woodworking. *One of each allowable natural characteristic is permitted in larger boards per the total exposed area indicated in the last column.*

### 100-T-5

#### Limits of Natural Characteristics Permitted

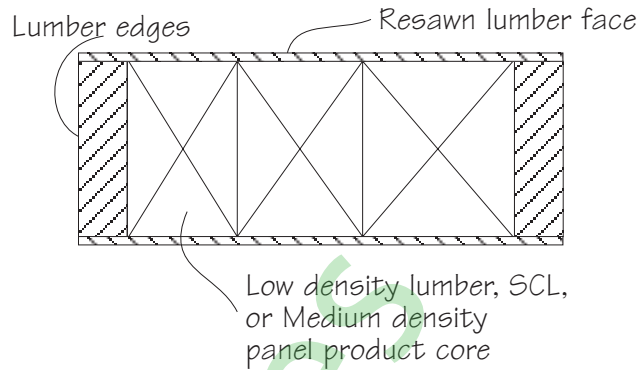
TYPE	SPECIES	GRADE I	
	All Grades supplied Plain Sawn, except when noted Rift or Quartered	No characteristics allowed in boards smaller than	Characteristics allowed in larger members (per indicated additional dimension)
Hardwoods	Natural Ash, Natural Birch, Basswood, Hard & Soft Maple, Poplar, Red Oak, White Oak, Mahogany & Teak	3870 sq. cm [600 sq. in.]	1 per 968 sq. cm [150 sq. in.]
	Select Red Birch, Select White Birch, Select Brown Ash, Select White Ash, Select White Hard Maple	3548 sq. cm [550 sq. in.]	1 per 839 sq. cm [130 sq. in.]
	Rift or Quarter Sawn Red or White Oak, Walnut, Cherry, Butternut	1774 sq. cm [275 sq. in.]	1 per 333 sq. cm [50 sq. in.]
Softwoods	All Heart Redwood	6774 sq. cm [1050 sq. in.]	1 per 1935 sq. cm [300 sq. in.]
	All Other Species	6194 sq. cm [960 sq. in.]	1 per 1935 sq. cm [300 sq. in.]
TYPE	SPECIES	GRADE II	
Hardwoods	Natural Ash, Natural Birch, Basswood, Hard & Soft Maple, Poplar, Red Oak, White Oak, Mahogany & Teak	2968 sq. cm [460 sq. in.]	1 per 968 sq. cm [150 sq. in.]
	Select Red Birch, Select White Birch, Select Brown Ash, Select White Ash, Select White Hard Maple	2581 sq. cm [400 sq. in.]	1 per 839 sq. cm [130 sq. in.]
	Rift or Quarter Sawn Red or White Oak, Walnut, Cherry, Butternut	1290 sq. cm [200 sq. in.]	1 per 333 sq. cm [50 sq. in.]
Softwoods	All Heart Redwood	3870 sq. cm [600 sq. in.]	1 per 1935 sq. cm [300 sq. in.]
	All Other Species	4129 sq. cm [640 sq. in.]	1 per 1935 sq. cm [300 sq. in.]
TYPE	SPECIES	GRADE III	
Hardwoods	Natural Ash, Natural Birch, Basswood, Hard & Soft Maple, Poplar, Red Oak, White Oak, Mahogany & Teak	1 per 1935 sq. cm [300 sq. in.]	1 per 903 sq. cm [140 sq. in.]
	Select Red Birch, Select White Birch, Select Brown Ash, Select White Ash, Select White Hard Maple	No such Grade this species	No such Grade this species
	Rift or Quarter Sawn Red or White Oak, Walnut, Cherry, Butternut	No such Grade this species	No such Grade this species
Softwoods	All Heart Redwood	No such Grade this species	No such Grade this species
	All Other Species	2258 sq. cm [350 sq. in.]	1 per 1935 sq. cm [300 sq. in.]

Species Not Listed: Consult your AWI/AWMAC woodwork manufacturer. The natural characteristics of species not listed above shall be as agreed to between buyer and seller during the design, species selection and specification process.

100-T-6

Veneered Construction

To secure wide and thick members in species with limited cutting potential, an acceptable technique is to apply thin lumber or veneer over the faces and edges of a compatible density lumber, structural composite lumber (SCL), or medium density panel product core.



Veneered Construction - Figure 100-08

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Veneered construction shall be permitted utilizing resawn lumber or commercially available veneers (Type I assembly for exterior work), and with matching as follows:

Grade I - For transparent finish - veneers shall be well matched for color and grain on all exposed faces and edges.

Grade II - For transparent finish - veneers shall be compatible for color on exposed faces and edges.

Grade III - For transparent or opaque finish, no selection for grain or color required.

100-T-7

Lumber Lengths

The availability of long lengths is dependent upon the species. Unless specified otherwise, the number of boards of the maximum practical length shown need not exceed 10% of the boards furnished. Specifier should check availability of large quantities of long lengths with an AWI/AWMAC woodworker prior to specification.

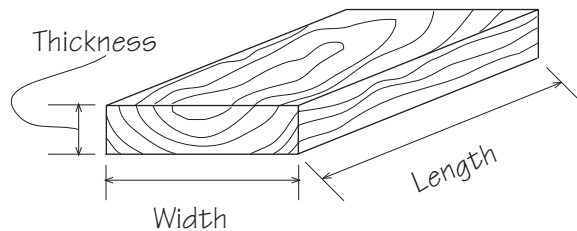
	SPECIES	MAXIMUM PRACTICAL LENGTHS AVAILABLE
TYPE	All solid lumber supplied Plain sawn, except when noted Rift or Quartered	
Hardwoods	Natural Ash, Natural Birch, Basswood, Hard & Soft Maple, Poplar, Red Oak, White Oak, & Mahogany	3300 mm [11' - 0"]
	Select Red Birch, Select White Birch, Select Brown Ash, Select White Ash, Select White Hard Maple	3000 mm [9' - 10"]
	Teak, Rift & Quarter Sawn Red or White Oak	2700 mm [8' - 10"] *
	Walnut, Cherry, Butternut	2300 mm [7' - 10"]
Softwoods	All Heart Redwood	6000 mm [19' - 8"]
	All other species	4700 mm [15' - 8"]

\* Rift cut lumber is generally only available in Oak. Acceptable rift cut lumber is narrower and shorter than any other cut. Rift cut lumber should not be specified when large dimensions are required.

100-T-8

Dimension Conventions

Lumber is generally dimensioned in the following conventional order: Thickness, followed by Width (across the grain direction), followed by Length (with the grain direction). Example: 19 mm [<sup>3</sup>/<sub>4</sub>"] (thick) x 162 mm [6-<sup>3</sup>/<sub>8</sub>"] (wide) x 2286 mm [90"] (long).



Dimensions - Figure 100-09

## 100-T-9

### Fire-Retardant Treatment

The natural fire-retardant qualities and acceptability of treatments varies among the species, and most are structural softwoods. Where certain items of architectural woodwork are required to have a flame spread classification to meet applicable building and safety codes, the choice of lumber species is restricted to those accepting treatment using currently available technology.

**Flame Spread Classification:** This is the generally accepted measurement for fire rating of materials. It compares the rate of flame spread on a particular species with the rate of flame spread on untreated Oak.

Most traditional authorities accept the following classes for flame spread:

Class I or A	0-25
Class II or B	26-75
Class III or C	76-200

Furniture and fixtures are generally not regulated by fire code requirements and are not fabricated from treated wood.

## 100-T-10

### Preservative Treatment for Exterior Woodwork

Modern technology has developed methods of treating certain species to extend their life when exposed to the elements. All lumber species used for exterior architectural woodwork, except species listed as "Resistant or very resistant" in the following tables (although it is desirable for those species) shall be treated with an industry-tested and accepted formulation listed by the Window and Door Manufacturers Association (WDMA) in the current edition of WDMA I.S. 4. See the Hallmark Certification section of [www.wdma.com](http://www.wdma.com) for the latest information.

Some domestic woods by heartwood decay resistance			Some imported woods by heartwood decay resistance		
Resistant or very resistant	Moderately resistant	Slightly or non-resistant	Resistant or very resistant	Moderately resistant	Slightly or non-resistant
Baldcypress, old growth (1)	Baldcypress, young growth (1)	Alder, red	Goncalo alves *	Avodire	Jelutong
Cedars	Douglas-fir	Ashes	Ipe (Iapacho) *	Benge	Meranti, light red (2)
Cherry, black	Larch, western	Beech	Jarrah *	Bubinga	Meranti, yellow (2)
Redwood, old growth	Redwood, young growth	Birches	Lignumvitae *	Keruing	Meranti, white (2)
Chestnut	Tamarack	Butternut	Mahogany, Genuine (Honduras)	Mahogany, African	Obeche
Cypress, Arizona		Hickories	Purpleheart *	Meranti, dark red (2)	Prana pine
Junipers		Maples	Spanish cedar	Sapele	Ramin
Locust, black *		Most pines (2)	Teak, old growth *	Teak, young growth	Sande
Oak, white (2)		True firs (western and eastern)			
Walnut, black		Sycamore			
Yew, Pacific *		Spruces			
		Yellow-poplar			

(1) Baldcypress is now largely second growth with a large proportion of sapwood. Substantial quantities of heartwood lumber of this species is not available. (2) More than one species included, some of which may vary in resistance from that indicated. — \* Exceptionally high decay resistance.

DATA: 1999 Wood Handbook, Table 3-10, Forest Products Laboratory, No. 7269, (excerpts)