BLESING'S HARDWOOD FLOORS

13 Sebago St.
Clifton, NJ 07013
Phn: 973-471-7171
Fax: 973-471-7172
HARDWOOD FLOOR
INSTALLATION & REFINISHING

# WOOD SPECIES

## USED IN WOOD FLOORING

RELATIVE HARDNESS OF SELECTED WOOD FLOORING SPECIES
(Ranked by Janka hardness rating)

The Janka (or side) hardness test measures the force required to embed a .444-inch steel ball to half its diameter in wood. It is one of the best measures of the ability of a wood species to withstand denting and wear. By the same token, it is also a good indicator of how hard or easy a species is to saw or nail. Northern red oak, for example, has a Janka hardness rating of 1290. Brazilian cherry, with a rating of 2350, is nearly twice as hard. If you're accustomed to working with red oak and decide to tackle a job with Brazilian Cherry, you can expect it to be much harder to cut and nail.


RELATIVE COST OF SELECTED WOOD FLOORING SPECIES
(Based on a cost factor of 1.00 for plainsawn select red oak)
How to use this chart: Costs for any species may vary according to current availability, location and other market factors. This chart is intended only to provide a comparison scale. Each species has been assigned a multiplier to be applied to the cost of plainsawn select red oak, chosen as the benchmark because of its widespread use in the flooring industry. Brazilian cherry, for example, has been assigned a cost multiplier of 1.30. If you know the cost of plainsawn select red oak, multiply by 1.3, and you have some idea what Brazilian cherry might cost. Please keep in mind, however, that these figures are only estimates; actual costs can vary greatly by locale, time of year and flooring style.


RELATIVE STABILITY OF SELECTED WOOD FLOORING SPECIES
(Ranked by dimensional change coefficient)
The numbers in the chart reflect the dimensional change coefficient for the various species, measured as tangential shrink-age or swelling within normal moisture content limits of 6-14 percent. Tangential change values will normally reflect changes in plainsawn wood. Quartersawn wood will usually be more dimensionally stable than plainsawn.

The dimensional change coefficient can be used to calculate expected shrinkage or swelling. Simply multiply the change in moisture content by the change coefficient, then multiply by the width of the board.
Example: A mesquite (change coefficient = .00129) board 5 inches wide experiences a moisture content change from 6 to 9 percent &-; a change of 3 percentage points. Calculation: 3 x .00129= .00387 x 5 = .019 inches.

In actual practice, however, change would be diminished in a complete floor, as the boards' proximity to each other tends to restrain movement.
The chart is best used for comparison.

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# ASH WHITE *Fraxinus americana*

## Appearance
COLOR: Heartwood is light tan to dark brown;sapwood is a creamy white.
Similar in appearance to white oak, but frequently more yellow.
GRAIN: Bold straight moderately open grain with occasional wavy figuring. Can have strong contrastin grain in plainsawn boards.
VARIATIONS WITHIN SPECIES & GRADES
Sometimes confused with hickory;the zone of large poresis more distinctive in ash, similar to that of red
oak.

## Properties
HARDNESS/JANKA: 1320; 2% harder than northern red oak.
DIMENSIONAL STABILITY: Above average (change coefficient .00274; 26% more stable than red oak.
DURABILITY: Elastic, hard; excellent shock resistance. Remains smooth under friction.

## Workability
SAWING/MACHINING: Good machining qualities.
SANDING: Sands Satisfactorily
NAILING: Good holding ability;good resistance to splitting.
FINISHING: No known problems.
Stains well.

## Cost:
(Relative to plainsawn select red oak)
MULTIPIER: 1.20

## Availability
Moderately available

Sample is ¾-by-2¼-inch square-edge solid strip. Top portion is finished with water base urethane; bottom with oil modified polyurethane.

# BRAZILIAN CHERRY *Hymenaea Courbaril*

## Appearance
COLOR: Sapwood is gray-white; heartwood is salmon red to orange-brown when fresh, and becomes russet or reddish brown when seasoned; often marked with dark streaks.
GRAIN: Mostly interlocked; texture is medium to rather coarse.
VARIATIONS WITHIN SPECIES AND GRADES: Moderate to high color variation.

## Properties
HARDNESS (JANKA): 2350; 82% harder than Northern red oak.
DIMENSIONAL STABILITY: Average (change coefficient .00300; 19% more stable than red oak). However, actual installations have demonstrated significant movement in use.
DURABILITY: Dense and very strong.

## Workability
SAWING/MACHINING: Sawing is difficult due to high density; requires frequent resharpening of tools. Planing is difficult due to interlocked grain. Can be machined to a smooth surface. Carbide tooling recommended.
SANDING: Sands well.
NAILING: Good holding ability, but due to hardness may require adjustment of angle of penetration and/or height.
FINISHING: No known problems.
COMMENTS: Light-sensitive; darkens rapidly upon exposure to sunlight.

## Cost
(relative to plainsawn select red oak)
MULTIPLIER: 1.30

## Availability
Readily available.

Sample is ¾-by-1½ inch square-edge solid strip. Top portion is finished with water base urethane; bottom with oil modified polyurethane.

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# HEART PINE Antique *Pinus spp.*

## Appearance
COLOR: Heartwood is yellow after cutting and turns deep pinkish tan to warm reddish brown within weeks due to high resin content. Sapwood remains yellow, with occasional blue-black sap stain.
GRAIN: Dense, with high figuring. Plainsawn is swirled; rift- or quartersawn is primarily pinstriped. Curly or burl grain is rare.
VARIATIONS WITHIN SPECIES AND GRADES: Moderate color variation.

## Properties
HARDNESS (JANKA): 1225; 5% softer than Northern red oak.
DIMENSIONAL STABILITY: Above average (change coefficient .00263; 29% more stable than red oak).
DURABILITY: Natural resistance to insect infestation in heartwood; dense.

## Workability
SAWING/MACHINING: Good machining and hand-tooling qualities.
SANDING: Tendency to clog paper due to high resin content; begin with coarse grade
NAILING: Good holding ability.
FINISHING: Accepts both surface and penetrating finishes. Some stains may blotch; raising grain first may help. To reduce the wood's tendency to repel finish coats, surface resins may be removed with a solvent that iscompatible with the finish to be used.
COMMENTS:

## Cost
(relative to plainsawn select red oak)
MULTIPLIER: 2.00

## Availability
Limited

Sample is ¾-by-3 inch square-edge solid strip. Top portion is finished with water base urethane; bottom with oil modified polyurethane.

# MAHOGANY SANTOS *Myroxylon Balsamum*

## Appearance
COLOR: Dark reddish brown.
GRAIN: Striped figuring in quartersawn selections; texture is even and very fine.
VARIATIONS WITHIN SPECIES AND GRADES: Moderate color variation.

## Properties
HARDNESS (JANKA): 2200; 71% harder than Northern red oak.
DIMENSIONAL STABILITY: Above average (change coefficient .00238; 36% more stable than red oak).
DURABILITY: Excellent.

## Workability
SAWING/MACHINING: Moderately difficult due to hardness; carbide tooling recommended.
SANDING: Sands satisfactorily.
NAILING: Good holding ability.
FINISHING: No known finishing problems.
COMMENTS: Some respiratory allergic potential.

## Cost
(relative to plainsawn select red oak)
MULTIPLIER: 1.55

## Availability
Moderately available.

Sample is ¾-by-3¼ inch square-edge solid strip. Top portion is finished with water base urethane; bottom with oil modified polyurethane.

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# MAPLE Sugar/Hard *Acer Saccharum*

## Appearance
COLOR: Heartwood is creamy white to light reddish brown; sapwood is pale to creamy white.
GRAIN: Closed, subdued grain, with medium figuring and uniform texture. Occasionally shows quilted, fiddleback, curly or bird's-eye figuring. Figured boards often culled during grading and sold at a premium.
VARIATIONS WITHIN SPECIES AND GRADES: Black maple (B. nigrum) is also hard; other species are classified as soft.

## Properties
HARDNESS (JANKA): 1450; 12% harder than Northern red oak.
DIMENSIONAL STABILITY: Average (change coefficient .00353; 4% more stable than red oak).
DURABILITY: Dense, strong, tough, stiff; excellent shock resistance -- often used in bowling alleys and athletic facilities. Markedly resistant to abrasive wear.

## Workability
SAWING/MACHINING: Density makes machining difficult.
SANDING: Sands satisfactorily.
NAILING: Fair resistance to splitting; good holding ability.
FINISHING: Takes neutral finish well; does not stain uniformly.
COMMENTS: Light color lends itself to contemporary light floors. Extra care must be taken during sanding and finishing, as sanding marks and finish lines are more obvious due to maple's density and light color.

## Cost
(relative to plainsawn select red oak)
MULTIPLIER: 1.30

## Availability
Commodity item; figured grains limited.

Sample is ¾-by-3 inch square-edge solid strip. Top portion is finished with water base urethane; bottom with oil modified polyurethane.

# OAK RED *Quercus spp.*

## Appearance
COLOR: Heartwood and sapwood are similar, with sapwood lighter in color; most pieces have a reddish tone. Slightly redder than white oak.
GRAIN: Open, slightly coarser (more porous) than white oak. Plainsawn boards have a plumed or flared grain appearance; riftsawn has a tighter grain pattern, low figuring; quartersawn has a flake pattern, sometimes called tiger rays or butterflies.
VARIATIONS WITHIN SPECIES AND GRADES: More than 200 subspecies in North America; great variation in color and grain, depending on the origin of the wood and corresponding differences in growing seasons. Northern, Southern and Appalachian red oak can all be divided into upland and lowland species. Because they grow more slowly, upland species generally have a more uniform grain pattern than lowland species, with more growth rings per inch.

## Properties
HARDNESS (JANKA): Northern 1290 (benchmark).
DIMENSIONAL STABILITY: Average (change coefficient .00369).
DURABILITY: Stiff and dense; resists wear, with high shock resistance, though less durable than white oak.

## Workability
SAWING/MACHINING: Above average in all machining operations except shaping.
SANDING: Sands satisfactorily, better than white oak.
NAILING: Good resistance to splitting; excellent holding ability.
FINISHING: Strong stain contrast because of large pores.
COMMENTS: Red oak generally works better than white for bleached floors, because it is more porous and accepts bleach better, and because tannins in white oak can discolor floor.

## Cost
(relative to plainsawn select red oak)
MULTIPLIER:
- 1.00 (plainsawn)
- 1.30 (quartersawn)
- 1.65 (riftsawn)

## Availability
Commodity item, available in all types, styles and sizes of flooring, including parquet, strip, plank and veneer, both unfinished and prefinished.

Sample is ¾-by-2¼ inch square-edge solid strip. Top portion is finished with water base urethane; bottom with oil modified polyurethane.

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# OAK WHITE *Quercus alba*

## Appearance
COLOR: Heartwood is light brown; some boards may have a pinkish tint or a slight grayish cast. Sapwood is white to cream.
GRAIN: Open, with longer rays than red oak. Occasional crotches, swirls and burls. Plainsawn boards have a plumed or flared grain appearance; riftsawn has a tighter grain pattern, low figuring; quartersawn has a flake pattern, sometimes called tiger rays or butterflies.
VARIATIONS WITHIN SPECIES AND GRADES: Considerable variation among boards in color and grain tex-ture, but variations not as pronounced as in red oak.

## Properties
HARDNESS (JANKA): 1360; 5% harder than Northern red oak.
DIMENSIONAL STABILITY: Average (change coefficient .00365; 1% more stable than red oak).
DURABILITY: More durable than red oak. Tannic acid in the wood protects it from fungi and insects.

## Workability
SAWING/MACHINING: Excellent machining qualities.
SANDING: Sands satisfactorily.
NAILING: Good resistance to splitting; excellent holding ability.
FINISHING: Absorbs finishes more evenly than red oak. Does not bleach well.
COMMENTS: During the finishing process, tannins at the surface can react with some liquids to turn the wood green or brown. This effect tends to be more pronounced with products that have a high water content, such as bleach and water-based finishes.

## Cost
(relative to plainsawn select red oak)
MULTIPLIER: .95

## Availability
Commodity item, available in nearly all types, styles and sizes of flooring, including parquet, strip, plank and veneer, both unfinished and prefinished.

Sample is ¾-by-3 inch square-edge solid strip. Top portion is finished with water base urethane; bottom with oil modified polyurethane.

# PINE Southern Yellow *Pinus spp.*

## Appearance
COLOR: Heartwood varies from light yellow/ orange to reddish brown or yellowish brown; sapwood is light tan to yellowish white.
GRAIN: Closed, with high figuring; patterns range from clear to knotty.
VARIATIONS WITHIN SPECIES AND GRADES: Longleaf pine (P. palustris), shortleaf pine (P. echinata), loblolly pine (P. taeda), slash pine (P. elliottii). All have many of the same characteristics as Douglas fir. Old-growth lumber in these varieties has substantially higher density and is more stable than second-growth material.

## Properties
HARDNESS (JANKA): Loblolly and shortleaf 690, 47% softer than Northern red oak; longleaf 870, 33% softer than N. red oak.
DIMENSIONAL STABILITY: Above average (change coefficient .00265; 28% more stable than red oak).
DURABILITY: Soft, fairly durable, although not as resistant to scuffs, dents and abrasions as the hardwoods. Often used for flooring, but may not be suitable for all applications due to its softness.

## Workability
SAWING/MACHINING: Good machining qualities.
SANDING: Resin in wood tends to clogs abrasives; frequent sandpaper changes are required.
NAILING: Good holding ability and resistance to splitting.
FINISHING: A durable finish can help minimize wear.
COMMENTS: Generally manufactured for flooring with no end-match; sometimes flooring is "distressed" to create an antique look.

## Cost
(relative to plainsawn select red oak)
MULTIPLIER: 0.95

## Availability
Commodity item, available as unfinished strip and plank flooring in a variety of widths and thicknesses through specialty wood flooring dealers and some lumberyards.

Sample is ¾-by-2¼ inch square-edge solid strip. Top portion is finished with water base urethane; bottom with oil modified polyurethane.

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# PURPLE HEART Amaranth *Peltogyne spp.*

## Appearance
COLOR: Heartwood is brown when freshly cut, turning deep purple to purplish brown over time. Sapwood is a lighter cream color.
GRAIN: Usually straight; medium to fine texture.
VARIATIONS WITHIN SPECIES AND GRADES: Moderate to high color variation.

## Properties
HARDNESS (JANKA): 1860; 44% harder than Northern red oak.
DIMENSIONAL STABILITY: Excellent (change coefficient .00212; 43% more stable than red oak).
DURABILITY: Very strong and dense.

## Workability
SAWING/MACHINING: Moderately difficult due to hardness; frequent sharpening of tools required; slow feed rate and carbide tooling recommended.
NAILING: Good holding ability.
SANDING: Sands satisfactorily.
FINISHING: Takes finishes well; some have found that water-based finishes hold color better. Tendency to bleed with some finishes.
COMMENTS: Heartwood is very resistant to drywood termites. Presence of minerals in some boards may cause uneven coloration.

## Cost
(relative to plainsawn select red oak)
MULTIPLIER: 2.30

## Availability
Limited

Sample is ¾-by-2¼ inch square-edge solid strip. Top portion is finished with water base urethane; bottom with oil modified polyurethane.

# WALNUT American Black *Juglans nigra*

## Appearance
COLOR: Heartwood ranges from a deep, rich dark brown to a purplish black. Sapwood is nearly white to tan. Difference between heartwood and sapwood color is great; some flooring manufacturers steam lumber to bleed the darker heartwood color into the sapwood, resulting in a more uniform color.
GRAIN: Mostly straight and open, but some boards have burled or curly grain. Arrangement of pores is similar to hickories and persimmon, but pores are smaller in size.
VARIATIONS WITHIN SPECIES AND GRADES: Great variety of color and figure within species, as well as variation in color among boards, especially in lower grades and from material that isn't steamed prior to kiln-drying.

## Properties
HARDNESS (JANKA): 1010; 22% softer than Northern red oak.
DIMENSIONAL STABILITY: Excellent (change coefficient .00274; 26% more stable than red oak).
DURABILITY: Moderately dense, very strong, good shock resistance. Not as dent-resistant as oak.

## Workability
SAWING/MACHINING: Easily worked with hand tools, and has excellent machining qualities.
SANDING: Sands satisfactorily.
NAILING: Fair resistance to splitting; good holding ability.
FINISHING: Finishes nicely, with a handsome grain pattern.
COMMENTS: Distinctive sweet aroma when worked. Frequently used as a highlight material for borders or other inlay techniques.

## Cost
(relative to plainsawn select red oak)
MULTIPLIER: 3.00

## Availability
Moderately available, normally in unfinished parquet, strip and in various plank widths as a special order. Available in fancy parquet patterns as a special order or custom mill.

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# WENGE Panga-panga *Mellittia spp.*

## Appearance

COLOR: Heartwood is yellow-brown when freshly cut, turning dark brown to almost black with alternate layers of light and dark. Sapwood is yellowish-white and clearly demarcated from heartwood.
GRAIN: Straight when quartersawn; coarse texture.
VARIATIONS WITHIN SPECIES AND GRADES: Moderate variations in color.

## Properties

HARDNESS (JANKA): 1630; 26% harder than Northern red oak.
DIMENSIONAL STABILITY: Excellent (change coefficient .00201; 46% more stable than red oak). However, actual installations have demonstrated significant movement in use.
DURABILITY: Average.

## Workability

SAWING AND MACHINING: Difficult due to rapid dulling of tools; carbide tooling recommended.
SANDING: Sands satisfactorily.
NAILING: Good holding ability.
FINISHING: Some solvent-based stains do not dry well.
COMMENTS: Dermatological and respiratory allergic potential.

## Cost

(relative to plainsawn select red oak)
MULTIPLIER: 5.50

## Availability

Limited

Sample is ¾-by-3 inch square-edge solid strip. Top portion is finished with water base urethane; bottom with oil modified polyurethane.