



## Beech

*Fagus sylvatica L.*

### Commercial names:

English:	European beech, Common beech.
Spanish:	Haya.
French:	Hêtre commun, Fau, Fayard, Fay, Feuteau.
Italian:	Faggio.
German:	Gemeine Buche, Retbuche.

### Common names:

Navarre:	Bacua.
Huesca:	Fage.
Catalonia:	Faix, Fatg.
Aran:	Hay.
Asturias:	Faya.
Basque Country:	Paga, Pago, Paya.

### Physical properties:

Density:	690-710-750 kg/m <sup>3</sup>	
Shrinkage:	Moderately Unstable-Unstable	
Shrinkage values:	Total	Unitary
Volumetric:	18.6-24.6%	(0.45-0.62)
Tangential:	12.0-15.0%	(0.26-0.50)
Radial:	5.0-8.0%	(0.12-0.30)
Hardness:	4.0	Semi-hard

### Mechanical properties (Wood free of defects)

Static bending:	90-166 N/mm <sup>2</sup>
Modulus of elasticity:	12,300-16,400 N/mm <sup>2</sup>
Compression parallel to grain:	52-64 N/mm <sup>2</sup>
Compression perpendicular to grain:	12 N/mm <sup>2</sup>
Shear:	7.7-10 N/mm <sup>2</sup>
Toughness:	4.4-8.8-12.0 J/cm <sup>2</sup>

### Origin and availability:

This is a European species which is more prevalent in the west than in the east. (Floral dominion: Western Euro-siberian. Montejo de la Sierra in the upper river basin of the Jarama River between Madrid and Guadalajara is the southern limit, and the 60th parallel is the northern limit.) In Spain the most important extensions of forests are in Navarre, in the Irati forests, and the Salazar Valley, and in Asturias to a lesser degree. The forested area, production and export are stable.

### Wood description:

Heartwood and sapwood are not differentiated. Color varies from an orange white to a more or less intense pink. The wood rays are easily visible in a tangential (plainsawn) section and are irregularly distributed in short spindle-shaped lines. They can also be seen in well polished quartersawn wood. The growth rings are regularly differentiated and the earlywood is much wider and lighter in color than the latewood. The wood is straight-grained although in very thick-timbered trees there may be some spiral grained/cross grained wood. The wood grain is fine textured.

### Drying:

The wood has a marked tendency to twist and split resulting in checks. Air drying lasts from four to six months for lumber 27mm thick and from ten to twelve months for a 50mm thickness. It is a common practice to steam the wood at a steaming temperature of 90° to 100° centigrade for one or two days. This preconditioning before drying partially frees the wood from internal tensions and decreases the modulus of elasticity. It does not affect the total drying time. The recommended drying schedules are number 7 from the CTBA and the D schedule from PRL.

### Natural durability and ease of penetration:

This wood is classified as not durable against the action of fungi, and susceptible to insects, termites and marine borers. The heartwood as well as the sapwood are penetrable.

### Technological properties:

The principal problem in sawing is the substantial shrinkage that characterizes this wood. Rotating the roundwood after each cut in order to free the wood from internal tensions in the most symmetric manner possible is recommended. When using band saws a cutting speed of 45m/s and a kerf of 0.5 mm is recommended. The recommended cutting speed for disk saws is 55 m/s.

The wood is well suited to obtaining rotary-cut veneer and sliced veneer. Rotary cutting and slicing can be performed on green wood to a thickness of up to 15-20 tenths of a millimeter. Previous heat treatment for wood of greater thickness is recommended.

Machining can be undertaken without difficulty. The wood has outstanding qualities for turning, chiseling, mortising and drilling. It has good bending qualities, although this property depends on the position of the wood within the tree. Wood from the lower portion of the tree is more easily curved than wood from the upper portion. And wood farther from the pith is better for this purpose than wood closer to the center.

Gluing and finishing present no problems. Boring holes is advisable before using nails or screws.

### Applications:

Interior carpentry: Mouldings./ Furniture and cabinetwork: curved pieces./ Decorative veneers./ Railroad ties./ Tool handles./ Shoe trees./ Small utensils./ Toys./ Musical instruments./ Pegs.