GARAPA

Family: FABACEAE-CAESALPINIOIDEAE (angiosperm)

Scientific name(s): Apuleia leiocarpa

Commercial restriction: no commercial restriction

Note: The variety "molaris" is found in the Amazonian forest, mainly in flooded areas. The main species, Apuleia leiocarpa is found mainly in the South of Brazil, in the Atlantic coast forests, easily colonizing cleared areas.

WOOD DESCRIPTION

Color: yellow

Sapwood: clearly demarcated

Texture: medium

Grain: straight or interlocked

Interlocked grain: marked

LOG DESCRIPTION

Diameter: from 60 to 90 cm

Thickness of sapwood: from 5 to 11 cm

Floats: no

Log durability: good

Note: Lemon-yellow becoming light brown with age. Slight ribbon like aspect, a bit moiré. Irregular interlocked grain.

PHYSICAL PROPERTIES

Physical and mechanical properties are based on mature heartwood specimens. These properties can vary greatly depending on origin and growth conditions.

	Mean	Std dev.
Specific gravity *:	0,79	0,06
Monnin hardness *:	6,7	1,8
Coeff. of volumetric shrinkage:	0,52 %	0,05 %
Total tangential shrinkage (TS):	7,5 %	1,4 %
Total radial shrinkage (RS):	4,2 %	0,9 %
TS/RS ratio:	1,8	
Fiber saturation point:	22 %	

Stability: moderately stable to stable

MECHANICAL AND ACOUSTIC PROPERTIES

	Mean	Std dev.
Crushing strength *:	63 MPa	8 MPa
Static bending strength *:	116 MPa	21 MPa
Modulus of elasticity *:	15880 MPa	1850 MPa

(*: at 12% moisture content, with 1 MPa = 1 N/mm²)

Musical quality factor: 133,7 measured at 2403 Hz

NATURAL DURABILITY AND TREATABILITY

Fungi and termite resistance refers to end-uses under temperate climate. Except for special comments on sapwood, natural durability is based on mature heartwood. Sapwood must always be considered as non-durable against wood degrading agents.
E.N. = Euro Norm

Funghi (according to E.N. standards): class 3 - moderately durable

Dry wood borers: durable - sapwood demarcated (risk limited to sapwood)

Termites (according to E.N. standards): class M - moderately durable

Treatability (according to E.N. standards): class 3 - poorly permeable

Use class ensured by natural durability: class 2 - inside or under cover (dampness possible)

Species covering the use class 5: Yes

Note: The natural durability of Grapia is very variable. In some cases, this variability can be observed inside the same piece of wood. This species cannot be used without appropriate preservative treatment for end-uses under use class 3 except for some parts of a work such as windows, less exposed than others (entrance doors, shutters, ...).
This species naturally covers the use class 5 (end-uses in marine environment or in brackish water) due to its high silica content. However, it is not recommended to use it in case of strong structural constraints due to its medium mechanical properties; it is most suitable for end-uses like shipbuilding.

REQUIREMENT OF A PRESERVATIVE TREATMENT

Against dry wood borer attacks: does not require any preservative treatment

In case of risk of temporary humidification: requires appropriate preservative treatment

In case of risk of permanent humidification: use not recommended

DRYING

Drying rate: slow
Risk of distortion: slight risk
Risk of casehardening: no
Risk of checking: slight risk
Risk of collapse: no

Possible drying schedule: 2

M.C. (%)	Temperature (°C) dry-bulb	wet-bulb	Air humidity (%)
Green	50	47	84
40	50	45	75
30	55	47	67
20	70	55	47
15	75	58	44

This schedule is given for information only and is applicable to thickness lower or equal to 38 mm.
It must be used in compliance with the code of practice.
For thickness from 38 to 75 mm, the air relative humidity should be increased by 5 % at each step.
For thickness over 75 mm, a 10 % increase should be considered.

SAWING AND MACHINING

Blunting effect: high
Sawteeth recommended: stellite-tipped
Cutting tools: tungsten carbide
Peeling: not recommended or without interest
Slicing: not recommended or without interest
Note: Slicing is very difficult due to the high silica content. In machining, due to the irregular interlocked grain, it is recommended to reduce the feed rate and the cutting angle.

ASSEMBLING

Nailing / screwing: good but pre-boring necessary
Gluing: correct

COMMERCIAL GRADING

Appearance grading for sawn timbers: According to NHLA grading rules (January 2007)
Possible grading: FAS, Select, Common 1, Common 2, Common 3

FIRE SAFETY

Conventional French grading: Thickness > 14 mm : M.3 (moderately inflammable)
Thickness < 14 mm : M.4 (easily inflammable)

Euroclasses grading: D s2 d0
Default grading for solid wood, according to requirements of European standard EN 14081-1 annex C (April 2009). It concerns structural graded timber in vertical uses with mean density upper 0.35 and thickness upper 22 mm.

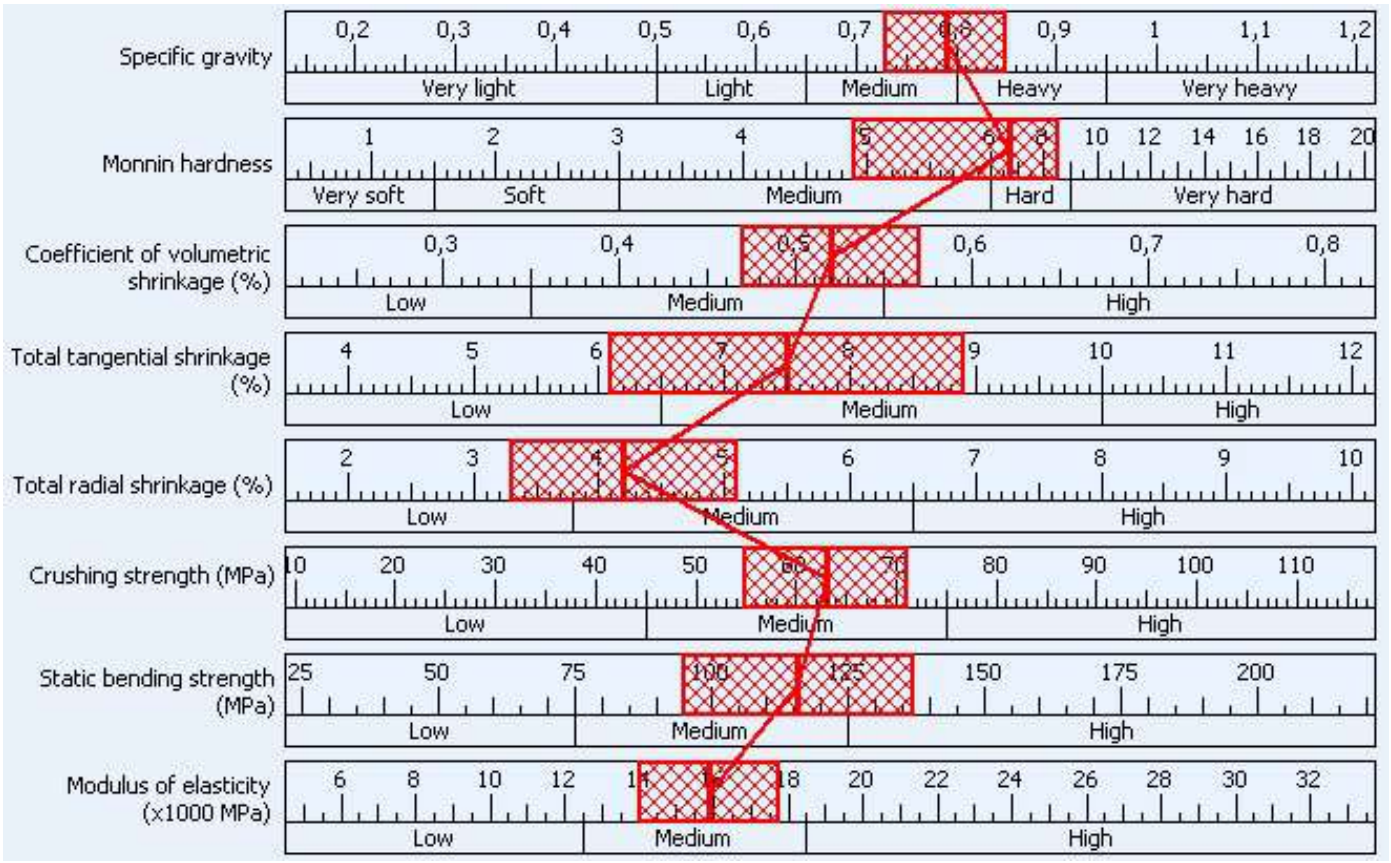
END-USES

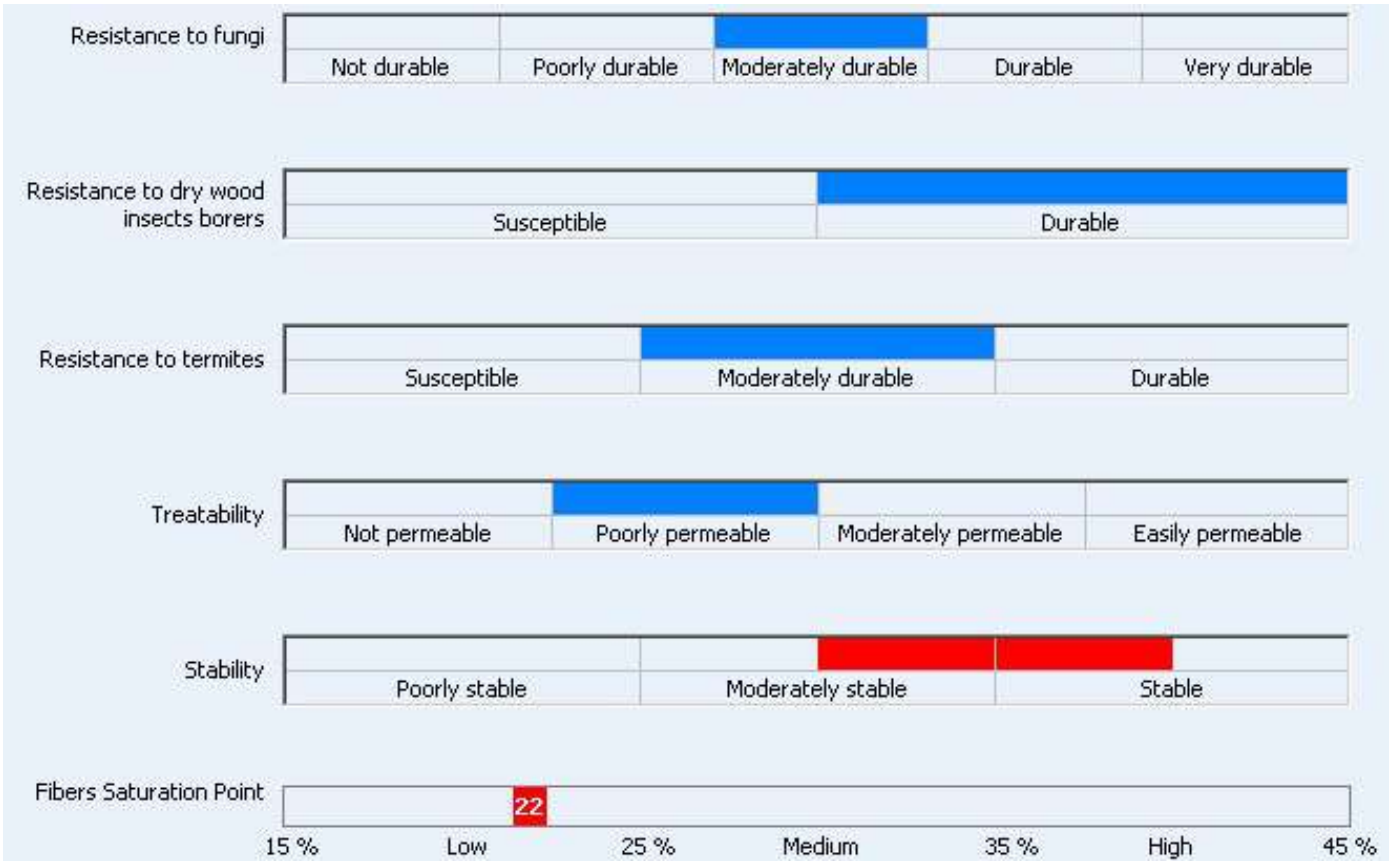
Exterior joinery
Heavy carpentry
Ship building (ribs)
Turned goods
Wood frame house
Industrial or heavy flooring
Ship building
Vehicle or container flooring
Tool handles (resilient woods)
Boxes and crates
Light carpentry
Hydraulic works (seawater)
Cooperage
Current furniture or furniture components
Flooring
Interior joinery
Stairs (inside)
Cabinetwork (high class furniture)
Formwork
Wood-ware

Note: Finishing is easy but filling is recommended.

MAIN LOCAL NAMES

Country	Local name	Country	Local name
Argentina	IBIRA PERE	Bolivia	ALMENDRILLO
Bolivia	AMARILLO	Brazil	AMARELAO
Brazil	BARAJUBA	Brazil	FERRO
Brazil	GARAPA	Brazil	GEMA-DE-OVO
Brazil	GRAPIA	Brazil	JATAI-AMARELO
Brazil	MUIRAJUBA	Brazil	MUIRATAUA
Colombia	COBRE	Paraguay	GRAPIA
Paraguay	YVIRA-PERE	Peru	ANA
Venezuela	GATEADO	Venezuela	MAPURITE


Specific gravity
0,2 0,3 0,4 0,5 0,6 0,7 0,8 0,9 1 1,1 1,2
Very light
Light
Medium
Heavy
Very heavy
Monnin hardness
1 2 3 4 5 6 8 10 12 14 16 18 20
Very soft
Soft
Medium
Hard
Very hard
Coefficient of volumetric shrinkage (%)
0,3 0,4 0,5 0,6 0,7 0,8
Low
Medium
High
Total tangential shrinkage (%)
4 5 6 7 8 9 10 11 12
Low
Medium
High
Total radial shrinkage (%)
2 3 4 5 6 7 8 9 10
Low
Medium
High
Crushing strength (MPa)
10 20 30 40 50 60 70 80 90 100 110
Low
Medium
High
Static bending strength (MPa)
25 50 75 100 125 150 175 200
Low
Medium
High
Modulus of elasticity (x1000 MPa)
6 8 10 12 14 16 18 20 22 24 26 28 30 32
Low
Medium
High


Resistance to fungi
Not durable
Poorly durable
Moderately durable
Durable
Very durable
Resistance to dry wood insects borers
Susceptible
Durable
Resistance to termites
Susceptible
Moderately durable
Durable
Treatability
Not permeable
Poorly permeable
Moderately permeable
Easily permeable
Stability
Poorly stable
Moderately stable
Stable
Fibers Saturation Point
22
15 %
Low
25 %
Medium
35 %
High
45 %