AZOBE

Family: OCHNACEAE (angiosperm)
Scientific name(s): Lophira alata
Lophira procera (synonymous)
Commercial restriction: no commercial restriction

WOOD DESCRIPTION

Color: dark red
Sapwood: clearly demarcated
Texture: coarse
Grain: interlocked
Interlocked grain: marked
Note: Dark red to purple brown wood. Intermediate zone between sapwood and heartwood. White deposits in the pores.

LOG DESCRIPTION

Diameter: from 60 to 100 cm
Thickness of sapwood: from 2 to 4 cm
Floats: no
Log durability: good

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 *:	1,06	0,04
Monnin hardness *:	10,7	2,7
Coeff. of volumetric shrinkage:	0,69 %	0,01 %
Total tangential shrinkage (TS):	10,3 %	0,9 %
Total radial shrinkage (RS):	7,3 %	1,0 %
TS/RS ratio:	1,4	
Fiber saturation point:	28 %	
Stability:	poorly stable	

MECHANICAL AND ACOUSTIC PROPERTIES

	Mean	Std dev.
Crushing strength *:	96 MPa	9 MPa
Static bending strength *:	162 MPa	21 MPa
Modulus of elasticity *:	21420 MPa	3539 MPa

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

Musical quality factor: 111,2 measured at 2569 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 2 - durable
Dry wood borers: durable - sapwood demarcated (risk limited to sapwood)
Termites (according to E.N. standards): class D - durable
Treatability (according to E.N. standards): class 4 - not permeable
Use class ensured by natural durability: class 4 - in ground or fresh water contact
Species covering the use class 5: Yes
Note: This species is listed in the European standard NF EN 350-2.
Transitional wood has a variable durability. Good resistance to marine borers in temperate water but moderate resistance in tropical water. This species is thus considerated as "moderately durable" towards marine borers and covers the use class 5 only when used in temperate or cold marine environment.
According to the European standard NF EN 335, performance length might be modified by the intensity of end-use exposition.

REQUIREMENT OF A PRESERVATIVE TREATMENT

Against dry wood borer attacks: does not require any preservative treatment
In case of risk of temporary humidification: does not require any preservative treatment
In case of risk of permanent humidification: does not require any preservative treatment

DRYING

Drying rate: slow
Risk of distortion: high risk
Risk of casehardening: no
Risk of checking: high risk
Risk of collapse: no
Note: Surface drying period recommended (3 to 4 months) (under shelter) prior to kiln drying. Drying very difficult for thickness > 38 mm.

Possible drying schedule: 1

M.C. (%)	Temperature (°C) dry-bulb	wet-bulb	Air humidity (%)
Green	40	37	82
40	44	38	68
30	44	36	59
20	46	36	52
15	49	37	46

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: fairly high
Sawteeth recommended: stellite-tipped
Cutting tools: tungsten carbide
Peeling: not recommended or without interest
Slicing: not recommended or without interest
Note: Requires power. Log turning sawing recommended (internal stresses). Some difficulties in planing due to interlocked grain.

ASSEMBLING

Nailing / screwing: good but pre-boring necessary
Gluing: correct (for interior only)
Note: Variable gluing properties. Gluing must be done carefully (dry wood and smooth surface) as the wood is very dense.

COMMERCIAL GRADING

Appearance grading for sawn timbers: According to SATA grading rules (1996)
For the "General Purpose Market":
Possible grading for square edged timbers: choix I, choix II, choix III, choix IV
Possible grading for short length lumbers: choix I, choix II
Possible grading for short length rafters: choix I, choix II, choix III
For the "Special Market":
Possible grading for strips and small boards (ou battens): choix I, choix II, choix III
Possible grading for rafters: choix I, choix II, choix III

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.

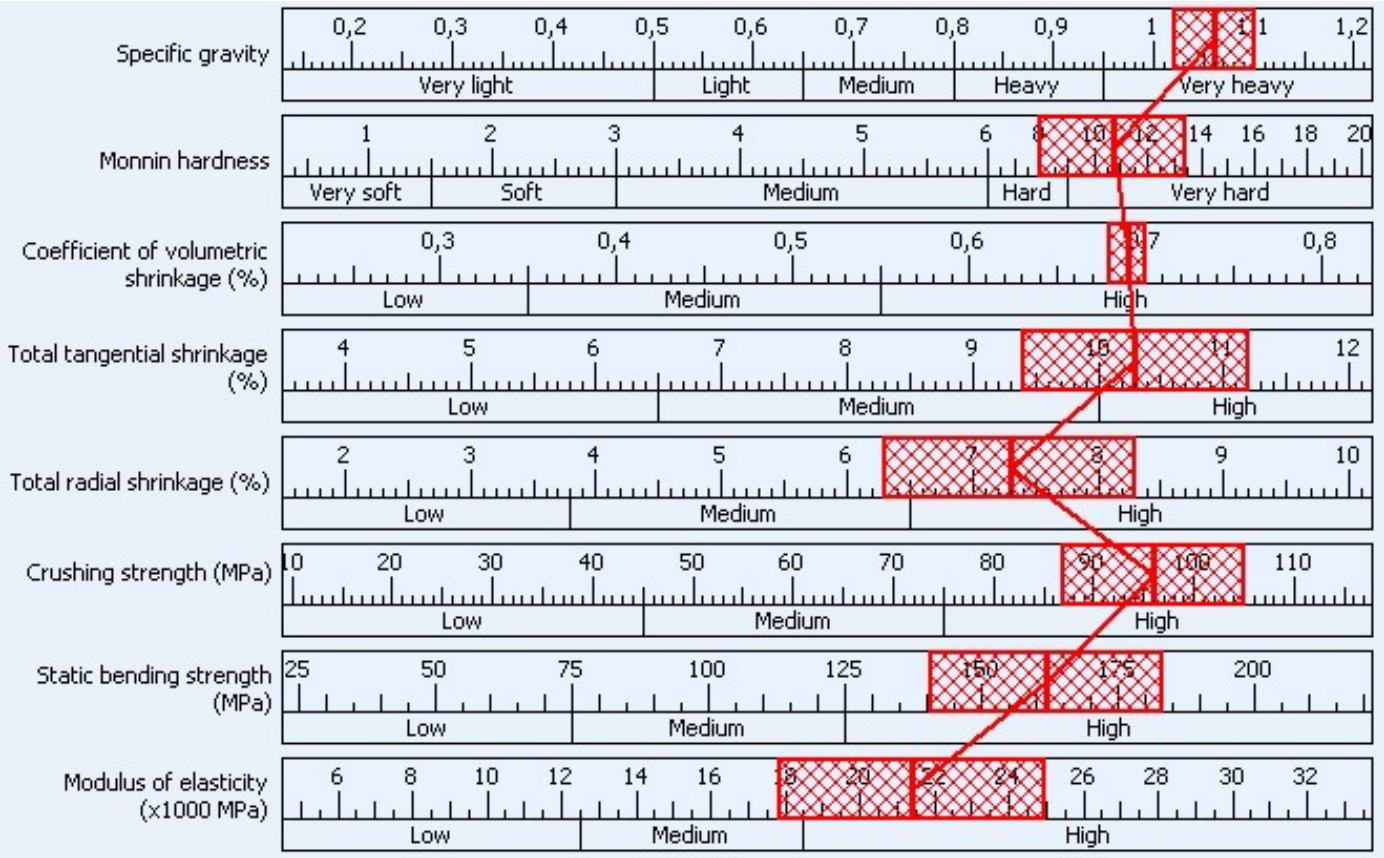
END-USES

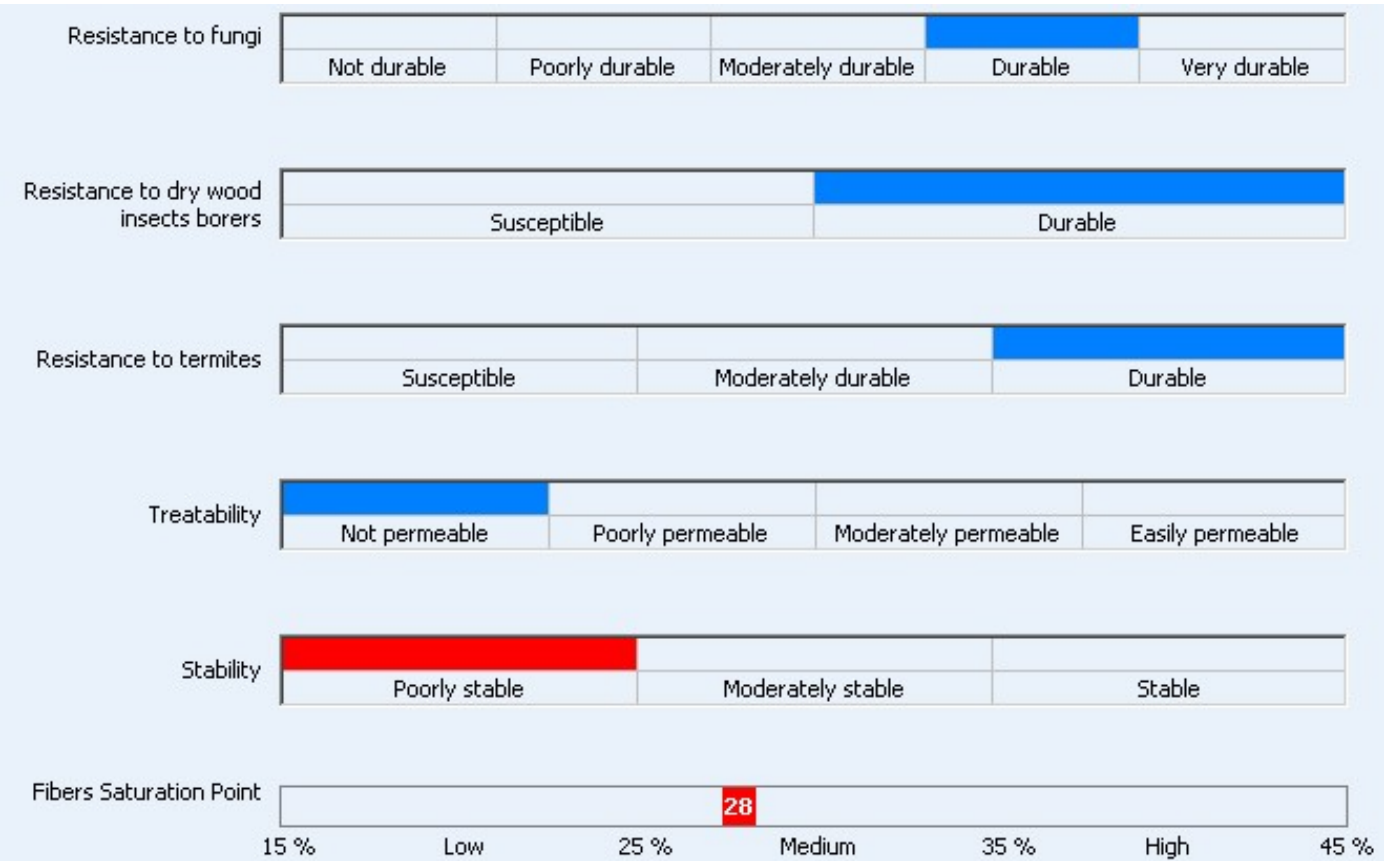
Hydraulic works (fresh water)
Bridges (parts in contact with water or ground)
Vehicle or container flooring
Heavy carpentry
Wood frame house
Poles
Resistant to one or several acids
Sleepers
Industrial or heavy flooring
Stairs (inside)
Bridges (parts not in contact with water or ground)
Cooperage
Stakes
Hydraulic works (seawater)

Note: For end-uses under permanent humidification, transition wood must be eliminated.

MAIN LOCAL NAMES

Country	Local name	Country	Local name
Benin	EKI	Cameroon	BONGOSSI
Cameroon	OKOKA	Congo	BONKOLE
Ivory Coast	AZOBE	Gabon	AKOGA
Ghana	KAKU	Equatorial Guinea	AKOGA
Nigeria	EBA	Nigeria	EKKI
Central African Republic	KOFYO	Sierra Leone	HENDUI
Germany	BONGOSSI	Germany	BONKOLE
United Kingdom	EKKI		


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
28
15 %
Low
25 %
Medium
35 %
High
45 %