# Mahogany (khaya spp.) (l)



## General information

### Designation

Khaya spp. (L)

### Typical uses

Furniture; cabinetwork; interior finish; boat construction; veneer.

## Composition overview

### Compositional summary

Cellulose/Hemicellulose/Lignin/12%H2O

| | | | | |
|---|---|---|---|---|
| Material family | Natural | | | |
| Base material | Wood (tropical) | | | |
| Renewable content | 100 | | | % |

## Composition detail (polymers and natural materials)

| | | | | |
|---|---|---|---|---|
| Wood | 100 | | | % |

## Price

| | | | | | |
|---|---|---|---|---|---|
| Price | * | 1.47 | - | 1.61 | USD/lb |

## Physical properties

| | | | | | |
|---|---|---|---|---|---|
| Density | | 0.0166 | - | 0.0206 | lb/in^3 |

## Mechanical properties

| | | | | | |
|---|---|---|---|---|---|
| Young's modulus | * | 1.39 | - | 1.7 | 10^6 psi |
| Yield strength (elastic limit) | * | 5.63 | - | 6.87 | ksi |
| Tensile strength | * | 8.96 | - | 10.9 | ksi |
| Elongation | * | 1.74 | - | 2.13 | % strain |
| Compressive strength | | 5.82 | - | 7.11 | ksi |
| Flexural modulus | | 1.26 | - | 1.54 | 10^6 psi |
| Flexural strength (modulus of rupture) | | 9.63 | - | 11.8 | ksi |
| Shear modulus | * | 0.103 | - | 0.126 | 10^6 psi |
| Shear strength | | 1.35 | - | 1.65 | ksi |
| Bulk modulus | * | 0.0609 | - | 0.0682 | 10^6 psi |
| Poisson's ratio | * | 0.35 | - | 0.4 | |
| Shape factor | | 5.2 | | | |
| Hardness - Vickers | * | 3.34 | - | 4.08 | HV |
| Hardness - Brinell | * | 5.95 | - | 7.27 | ksi |
| Hardness - Janka | * | 751 | - | 917 | lbf |
| Fatigue strength at 10^7 cycles | * | 2.89 | - | 3.52 | ksi |
| Mechanical loss coefficient (tan delta) | * | 0.0077 | - | 0.0094 | |
| Differential shrinkage (radial) | | 0.11 | - | 0.15 | % |
| Differential shrinkage (tangential) | | 0.2 | - | 0.22 | % |
| Radial shrinkage (green to oven-dry) | | 2.3 | - | 2.8 | % |
| Tangential shrinkage (green to oven-dry) | | 4.1 | - | 5 | % |
| Volumetric shrinkage (green to oven-dry) | * | 11 | - | 18 | % |
| Work to maximum strength | | 0.622 | - | 0.76 | ft.lbf/in^3 |

## Impact & fracture properties

| | | | | | |
|---|---|---|---|---|---|
| Fracture toughness | * | 3.28 | - | 4 | ksi.in^0.5 |

## Thermal properties

| | | | | | |
|---|---|---|---|---|---|
| Glass temperature | | 171 | - | 216 | °F |

| | | | | | |
|---|---|---|---|---|---|
| Maximum service temperature | | 248 | - | 284 | °F |
| Minimum service temperature | * | -99.4 | - | -9.4 | °F |
| Thermal conductivity | * | 0.133 | - | 0.162 | BTU.ft/hr.ft^2.°F |
| Specific heat capacity | | 0.396 | - | 0.408 | BTU/lb.°F |
| Thermal expansion coefficient | * | 1.11 | - | 6.11 | µstrain/°F |

## Electrical properties

| | | | | | |
|---|---|---|---|---|---|
| Electrical resistivity | * | 6e13 | - | 2e14 | µohm.cm |
| Dielectric constant (relative permittivity) | * | 5.24 | - | 6.4 | |
| Dissipation factor (dielectric loss tangent) | * | 0.059 | - | 0.072 | |
| Dielectric strength (dielectric breakdown) | * | 10.2 | - | 15.2 | V/mil |

## Optical properties

| | |
|---|---|
| Transparency | Opaque |

## Magnetic properties

| | |
|---|---|
| Magnetic type | Non-magnetic |

## Bio-data

| | |
|---|---|
| RoHS (EU) compliant grades? | ✓ |
| Food contact | Yes |

## Durability

| | |
|---|---|
| Water (fresh) | Limited use |
| Water (salt) | Limited use |
| Weak acids | Limited use |
| Strong acids | Unacceptable |
| Weak alkalis | Acceptable |
| Strong alkalis | Unacceptable |
| Organic solvents | Acceptable |
| Oxidation at 500C | Unacceptable |
| UV radiation (sunlight) | Good |
| Flammability | Highly flammable |

## Primary production energy, CO2 and water

| | | | | | |
|---|---|---|---|---|---|
| Embodied energy, primary production | * | 4.99e3 | - | 5.5e3 | BTU/lb |
| CO2 footprint, primary production | * | 0.574 | - | 0.633 | lb/lb |
| NOx creation | | 0.00257 | - | 0.00284 | lb/lb |
| SOx creation | | 0.00656 | - | 0.00725 | lb/lb |
| Water usage | * | 1.84e4 | - | 2.03e4 | in^3/lb |

## Processing energy, CO2 footprint & water

| | | | | | |
|---|---|---|---|---|---|
| Coarse machining energy (per unit wt removed) | * | 558 | - | 616 | BTU/lb |
| Coarse machining CO2 (per unit wt removed) | * | 0.0973 | - | 0.108 | lb/lb |
| Fine machining energy (per unit wt removed) | * | 3.74e3 | - | 4.13e3 | BTU/lb |
| Fine machining CO2 (per unit wt removed) | * | 0.652 | - | 0.721 | lb/lb |
| Grinding energy (per unit wt removed) | * | 7.28e3 | - | 8.04e3 | BTU/lb |
| Grinding CO2 (per unit wt removed) | * | 1.27 | - | 1.4 | lb/lb |

## Recycling and end of life

| | | | | | |
|---|---|---|---|---|---|
| Recycle | ✗ | | | | |
| Recycle fraction in current supply | | 8.55 | - | 9.45 | % |
| Downcycle | ✓ | | | | |
| Combust for energy recovery | ✓ | | | | |

| | | | | |
|---|---|---|---|---|
| Heat of combustion (net) | * 8.49e3 | - | 9.16e3 | BTU/lb |
| Combustion CO2 | * 1.69 | - | 1.78 | lb/lb |
| Landfill | ✓ | | | |
| Biodegrade | ✓ | | | |

## Eco-indicators for principal component

| | | | | |
|---|---|---|---|---|
| Eco-indicator 95 | 2.99 | | | millipoints/lb |
| EPS value | 62.7 | - | 69.3 | |

## Notes

### Warning

All woods have properties which show variation; they depend principally on growth conditions and moisture content.

## Links

ProcessUniverse

Reference

Shape