

General information

Designation

Ochroma spp. (MD) L

Tradenames

FLEXICORE, CONTOURKORE, PRO-BALSA

Typical uses

Cores for sandwich structures; model building; floatation; insulation;

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 | * 6.7 | - | 10.8 | USD/kg |
| Price per unit volume | * 1.14e3 | - | 2.26e3 | USD/m^3 |

Physical properties

| | | | | |
|------------------|-----|---|------|--------|
| Density | 170 | - | 210 | kg/m^3 |
| Relative density | 0.1 | - | 0.15 | |
| Cells/volume | 500 | - | 1e3 | /mm^3 |
| Anisotropy ratio | 10 | - | 30 | |

Mechanical properties

| | | | | |
|--|--------|---|------|----------|
| Young's modulus | 4.2 | - | 5.2 | GPa |
| Yield strength (elastic limit) | * 11.4 | - | 14 | MPa |
| Tensile strength | 16 | - | 25 | MPa |
| Elongation | * 1.03 | - | 1.26 | % strain |
| Compressive strength | 8.5 | - | 12.5 | MPa |
| Compressive stress @ 25% strair | 7.5 | - | 9 | MPa |
| Flexural modulus | 3.4 | - | 4.2 | GPa |
| Flexural strength (modulus of rupture) | 18 | - | 22 | MPa |
| Shear modulus | * 0.31 | - | 0.38 | GPa |
| Shear strength | * 3.2 | - | 3.9 | MPa |
| Bulk modulus | * 0.08 | - | 0.1 | GPa |

| | | | | |
|--|----------|---|-------|-------------------|
| Poisson's ratio | * 0.35 | - | 0.4 | |
| Shape factor | 5.5 | | | |
| Hardness - Vickers | * 0.35 | - | 0.43 | HV |
| Hardness - Brinell | * 9.3 | - | 11.3 | HB |
| Hardness - Janka | * 0.35 | - | 0.43 | kN |
| Fatigue strength at 10 ⁷ cycles | * 5.4 | - | 6.6 | MPa |
| Mechanical loss coefficient (tan delta) | * 0.0122 | - | 0.015 | |
| Densification strain | 0.65 | - | 0.75 | |
| Differential shrinkage (radial) | * 0.05 | - | 0.06 | % |
| Differential shrinkage (tangential) | * 0.07 | - | 0.09 | % |
| Radial shrinkage (green to oven-dry) | * 3.2 | - | 7 | % |
| Tangential shrinkage (green to oven-dry) | 4 | - | 4.8 | % |
| Volumetric shrinkage (green to oven-dry) | 6.8 | - | 8.3 | % |
| Work to maximum strength | * 13 | - | 15.9 | kJ/m ³ |

Impact & fracture properties

| | | | | |
|--------------------|-----|---|-----|----------------------|
| Fracture toughness | 0.5 | - | 0.6 | MPa.m ^{0.5} |
|--------------------|-----|---|-----|----------------------|

Thermal properties

| | | | | |
|-------------------------------|--------|---|--------|------------|
| Glass temperature | 77 | - | 102 | °C |
| Maximum service temperature | 120 | - | 140 | °C |
| Minimum service temperature | * -73 | - | -23 | °C |
| Thermal conductivity | * 0.09 | - | 0.12 | W/m.°C |
| Specific heat capacity | 1.66e3 | - | 1.71e3 | J/kg.°C |
| Thermal expansion coefficient | * 2 | - | 11 | µstrain/°C |

Electrical properties

| | | | | |
|--|---------|---|-------|---------|
| Electrical resistivity | * 6e13 | - | 2e14 | µohm.cm |
| Dielectric constant (relative permittivity) | * 2.45 | - | 3 | |
| Dissipation factor (dielectric loss tangent) | * 0.021 | - | 0.026 | |
| Dielectric strength (dielectric breakdown) | 4.85 | - | 4.9 | MV/m |

Magnetic properties

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

Optical properties

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

Critical materials risk

| | | | | |
|-----------------------------------|----|--|--|--|
| Contains >5wt% critical elements? | No | | | |
|-----------------------------------|----|--|--|--|

Durability

| | |
|-------------------------|------------------|
| Water (fresh) | Limited use |
| Water (salt) | Limited use |
| Weak acids | Limited use |
| Strong acids | Unacceptable |
| Weak alkalis | Limited use |
| 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 | * 11.6 | - | 12.8 | MJ/kg |
| CO2 footprint, primary production | * 0.574 | - | 0.633 | kg/kg |
| Water usage | * 665 | - | 735 | l/kg |

Processing energy, CO2 footprint & water

| | | | | |
|---|----------|---|--------|-------|
| Coarse machining energy (per unit wt removed) | * 0.993 | - | 1.1 | MJ/kg |
| Coarse machining CO2 (per unit wt removed) | * 0.0745 | - | 0.0823 | kg/kg |
| Fine machining energy (per unit wt removed) | * 5.66 | - | 6.25 | MJ/kg |
| Fine machining CO2 (per unit wt removed) | * 0.424 | - | 0.469 | kg/kg |
| Grinding energy (per unit wt removed) | * 10.8 | - | 12 | MJ/kg |
| Grinding CO2 (per unit wt removed) | * 0.813 | - | 0.899 | kg/kg |

Recycling and end of life

| | | | | |
|------------------------------------|--------|---|------|-------|
| Recycle | ✗ | | | |
| Recycle fraction in current supply | 8.55 | - | 9.45 | % |
| Downcycle | ✓ | | | |
| Combust for energy recovery | ✓ | | | |
| Heat of combustion (net) | * 19.8 | - | 21.3 | MJ/kg |
| Combustion CO2 | * 1.69 | - | 1.78 | kg/kg |
| Landfill | ✓ | | | |
| Biodegrade | ✓ | | | |

Notes

Warning

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

Links

ProcessUniverse

Reference

Shape
