General information

Designation

Ochroma spp. (MD)

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	* 3.04	-	4.88	USD/lb
Price per unit volume	* 32.3	-	64	USD/ft^3

Physical properties

Density	0.00614	-	0.00759	lb/in^3
Relative density	0.1	-	0.15	
Cells/volume	8.19e6	-	1.64e7	/in^3
Anisotropy ratio	10	-	30	

Mechanical properties

Young's modulus	0.0218	-	0.0276	10^6 psi
Yield strength (elastic limit)	0.087	-	0.145	ksi
Tensile strength	0.102	-	0.174	ksi
Elongation	* 1.26	-	1.54	% strain
Compressive strength	0.0899	-	0.174	ksi
Compressive stress @ 25% strain	0.16	-	0.305	ksi
Flexural modulus	0.0203	-	0.0247	10^6 psi
Flexural strength (modulus of rupture)	0.131	-	0.145	ksi
Shear modulus	* 0.00232	-	0.00334	10^6 psi
Shear strength	* 1.39	-	1.7	ksi
Rolling shear strength	* 0.0508	-	0.154	ksi

Bulk modulus	*	0.0116	-	0.0145	10^6 psi
Poisson's ratio	*	0.02	-	0.04	
Shape factor		5.1			
Hardness - Vickers	*	0.28	-	0.34	HV
Hardness - Brinell	*	4.6	-	5.7	HB
Hardness - Janka	*	62.9	-	76.4	lbf
Fatigue strength at 10^7 cycles	*	0.0363	-	0.0479	ksi
Mechanical loss coefficient (tan delta)	*	0.06	-	0.074	
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	*	0.0157	-	0.0193	ft.lbf/in^3

Impact & fracture properties

Fracture toughness		0.0209	-	0.0264	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	*	0.0214	-	0.026	BTU.ft/hr.ft^2.°F
Specific heat capacity		0.396	-	0.408	BTU/lb.°F
Thermal expansion coefficient	*	10.3	-	15.1	µstrain/°F

Electrical properties

Electrical resistivity	*	8.27e13	-	2.76e14	µohm.in
Dielectric constant (relative permittivity)	*	1.68	-	2.05	
Dissipation factor (dielectric loss tangent)	*	0.014	-	0.017	
Dielectric strength (dielectric breakdown)		123	-	124	V/mil

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	* 4.99e3	-	5.5e3	BTU/lb
CO2 footprint, primary production	* 0.574	-	0.633	lb/lb
Water usage	* 1.84e4	-	2.03e4	in^3/lb

Processing energy, CO2 footprint & water

Coarse machining energy (per unit wt removed)	* 223	-	246	BTU/lb
Coarse machining CO2 (per unit wt removed)	* 0.0389	-	0.043	lb/lb
Fine machining energy (per unit wt removed)	* 391	-	432	BTU/lb
Fine machining CO2 (per unit wt removed)	* 0.0682	-	0.0753	lb/lb
Grinding energy (per unit wt removed)	* 577	-	638	BTU/lb
Grinding CO2 (per unit wt removed)	* 0.101	-	0.111	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	✓			

Notes

Warning

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

Links

ProcessUniverse

Reference

Shape