

SITKA SPRUCE

Botanical Name:
Pinus sitchensis (Bong.) Carr.

Sitka spruce grows along the Coast in a narrow band. It is most common along the coastal fog-belt and river and stream flood plains. It attains its best development on the Queen Charlotte Islands. This tree is the largest of the spruces and grows up to 70 metres tall and 2 metres in diameter. While Sitka spruce grows in pure stands, it is also found common mixed with Douglas-fir, western red cedar and red alder.



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Common Uses

Sitka spruce is used in a variety of structural products. High grades of Sitka spruce are popular for specialty marine applications such as masts, spars and deck beams, and for ladder stock and industrial equipment where a high strength-to-weight ratio is desired. During the First World War this species assumed great importance for airplane construction.

Clear grades are used in fine interior finishing such as sliding screens, mouldings, joinery and trim. It is particularly popular when an even-coloured natural wood finish is desired. The top grade clear wood is used for piano and guitar sound-boards as it has excellent resonating properties.

Sitka spruce lumber is dried according to end-use and customer specifications. Kiln drying inhibits natural staining of the wood, improves its strength and stiffness, enhances its appearance, and increases its resistance to decay and attack by insects.

PHYSICAL PROPERTIES		
DENSITY (kg/m ³)	Green	347
	Air Dry	387
SPECIFIC GRAVITY (12% M.C.)	Standard	0.35
HARDNESS (N)	Side	2200
	End	3090
MOE (Mpa)	Green	9450
	Air Dry	11200
MOR (Mpa)	Green	37.4
	Air Dry	69.8
COMPRESSION PARALLEL (Mpa)	Air Dry	37.8
COMPRESSION PERPENDICULAR (Mpa)	Air Dry	4.10
SHEAR (Mpa)	Air Dry	6.78
CLEAVAGE (N/mm Width)	Air Dry	38.0
SHRINKAGE	Radial (OD)	4.6%
OD = oven dry	Tangential (OD)	7.8%
air = air dry 12%	Volumetric (OD)	11.7%
	Volumetric (air)	6.0%
	Tang / Rad ratio	1.7

VISUAL PROPERTIES	
COLOUR	
Heartwood	Light pinkish-brown.
Sapwood	Creamy white to light yellow.
Heartwood / Sapwood Contrast	The sapwood is wide with little contrast between heartwood and sapwood.
Latewood / Earlywood Contrast	The annual growth rings have a gradual transition from earlywood to latewood.
GRAIN	
The wood is generally straight-grained with a fine, uniform texture.	
FIGURE	
Plainsawn lumber or rotary-cut veneer: Distinct, inconspicuous growth ring. Quartersawn lumber or quarter-sliced veneer: Faint growth ring stripe.	
OTHER	
Non resinous, without odour.	



WORKING PROPERTIES

Sitka spruce has a high strength-to-weight ratio and is well known for its working properties. The wood dries rapidly with small dimensional movement and little tendency to check. It is relatively easy to work, with good machining qualities. It planes and shapes well and can be sanded to a smooth finish. The wood glues easily, has moderate nail and screw holding ability, and takes a good finish.

PROCESS	PERFORMANCE	COMMENTS
MACHINING		
Planing	Excellent planing quality	Recommended planer settings: 12° hook angle and 20 kmpi (knife marks per inch). Takes a smooth silky finish provided sharp tools are used.
Turning	Medium to low surface quality	Common defects: torn out grain.
Sawing	Easy to work with tools	Easy to work provided cutting edges are kept sharp and the wood is free of knots.
Boring	Medium	Medium to good boring quality with brad point bits and lower quality with single twist bits.
Mortising	Good	Good mortising quality when using both chain and hollow chisel mortises.
Shaping	Good shaping quality	Recommend the use of a counter piece for end-grain shaping.
Veneering	Good	
Sanding	Good	Excellent sanding quality.
FASTENING		
Screwing	Moderate	Average screw retention: 402 lb.
Lateral Nail Holding	N/A	
Nail Retention	Good	
Gluing	Easy	Bonds very easily with adhesives of a wide range of properties and under a wide range of bonding conditions.
FINISHING		
Staining	Easy to moderate	Smooth finish achieved. Light stains work well but dark stains magnify the uneven colours produced by different textures in wood. A wash coat would even out the colour.
Painting	Average to good paint holding ability	
Lacquering	Good	
Waxing	Good	Best results are obtained when using light-coloured waxes (e.g. Mellow Pine).
DRYING		
Ease of Drying	Easy to moderately easy	Dries rapidly and quite well, but care is required to reduce warping, splitting and loosening of knots.
DURABILITY		
Natural Decay Resistance	Slightly durable	Not appropriate for prolonged outdoor exposure.
Treatability	Impermeable	Can be improved by incising.



Commercial Availability

In North America structural grades are in accordance with the National Lumber Grades Authority (NLGA) rules for dimension lumber. Sitka spruce is currently marketed under the Northern Species group making its official structural design value lower than SPF, Hem-Fir, or DFir-Larch.

Sitka spruce is commonly produced in appearance grades according to NLGA rules. Clears, shop lumber and moulding stock are most common. Sitka spruce is also offered in export grades for Japan and other markets.

** Marketed under the commercial name Coast Sitka Spruce*



Data for this factsheet has been compiled by Forintek Canada Corp. from internal and external scientific sources. Forintek is a not-for-profit technical research institute serving the Canadian forest sector.