

# Douglas fir

## British Columbia's famous fir

Douglas fir (*Pseudotsuga menziesii*) is Canada's largest conifer and the tree that first made British Columbia famous as a producer of exceptionally fine timber. It is found throughout the southern half of the province extending into south-western Alberta. The species reaches its northern limit near the Queen Charlotte Islands. It grows to its magnificent best on the coast in fairly deep, moist sites where it comprises about 10% of the forest.

A dominant species with a distinctive thick reddish-brown bark, Douglas fir often grows in pure stands. The tall, branch-free trunk of larger trees yields fine-grained Clear timber in long lengths as well as Factory grades for remanufacture and a wide range of high strength structural products.

Forest fires historically cleared the soil for Douglas fir, which are among the first trees to grow in a newly open area. Today, modern forest stewardship practices help provide a natural environment for the young Douglas fir to thrive and regenerate.



### *Responsible timber harvesting*

All forest products companies harvesting Douglas fir in coastal British Columbia recognize that the forest is a precious resource that must be carefully managed and continually renewed. Intensive silvicultural and forest protection operations help renew the Douglas fir resource. Every company has ISO certification and many are working towards certification under other forest management certification programs.

## The wood's appearance and properties

The strongest of British Columbia's family of fine softwoods, Douglas fir is characterized by strength, stiffness and durability.

The narrow sapwood is light in color, while the wider and more durable heartwood ranges from yellowish to reddish brown. Spring and summerwood have a pronounced difference in color, with the summerwood having darker and more sharply defined bands. This difference in color results in a distinctive grain pattern when the log is flat-sawn.

Douglas fir seasons well and rapidly, dries evenly and remains straight and true with negligible checking or distortion. The wood is



stable in use and has good decay resistance in its natural state.

Douglas fir works well with power tools, has good nail and screw holding ability, glues well and accepts paints and stains satisfactorily.

A comprehensive tabulation of Douglas fir's physical properties and working characteristics and comparisons with other British Columbia coastal softwoods is shown on page 3.



## Widely available in Clear, Factory, Construction and custom grades



Douglas fir's suitability for widespread use in the construction and secondary remanufacturing industries derives from both its desirable physical properties and the wide range of grades in which it is available.

All Douglas fir lumber is manufactured, graded and sorted in compliance with the provisions of the relevant domestic or foreign grading rule. Douglas fir is readily available in the following Canadian grade classifications:

<b>Clear</b> (Knot free)	No. 2 Clear and Better No. 3 Clear No. 4 Clear
<b>Factory</b> (Remanufactured for Clear recovery)	Factory Flitch Shop Flitch No. 1 Shop and Better No. 2 Shop Moulding Stock A & B
<b>Construction</b>	Light Framing Structural Light Framing Structural Joists and Planks Merchantable

A full description of the above grades and the range of available sizes can be found in the Coast Forest publication *Wood Species and Products from the Coast Region of British Columbia* and on website [www.coastforest.org](http://www.coastforest.org).

## A widely used structural timber

Douglas fir has many uses and is a widely specified structural timber, well regarded by engineers and builders, especially for structural components and heavy timber applications. It is also used extensively for pilings, railway ties, sawmill and warehouse construction and numerous other areas where structural performance is paramount. A framing lumber for both light and heavy construction, Douglas fir can be counted on as strong, stiff, stable wood.

Because of Douglas fir's high strength and good gluing characteristics, it is commonly used in the manufacture of glued-laminated beams for a variety of structures, including arenas, pools, churches and supermarkets.



The surface appearance and easy-working properties of Douglas fir are appropriate to the manufacture of window and door frames, mouldings, cabinets and other joinery. The hardness and strength of Douglas fir add the dimension of durability.

Industrial applications, including tanks, vats and other storage containers are also prime applications for Douglas fir because of its high resistance to corrosion as well as its structural performance. Its stability and workability make it also in demand for the manufacture of industrial component parts.

*Comparative Physical Properties  
of Coast Species*

		High Range ♦	Low Range ○	Hem-Fir		Douglas Fir <i>Pseudotsuga menziesii</i>	Sitka Spruce <i>Picea sitchensis</i>	Western Red Cedar <i>Thuja plicata</i>	Yellow Cedar <i>Chamaecyparis nootkatensis</i>
				Amabilis Fir <i>Abies Amabilis</i>	Pacific Coast Hemlock <i>Tsuga heterophylla</i>				
Physical Properties	Density (12%-kg/m <sup>3</sup> )			445	480	545	430	385	480
	Specific Gravity (12% m.c.)			0.39	0.43	0.49	0.39	0.34	0.43
	Bending Strength (MOR) (MPa)			68.9	81.1	88.6	69.5	53.8	79.7
	Stiffness (MOE) (x10 <sup>3</sup> MPa)			11.4	12.3	13.5	11.2	8.3	11.0
	Compression parallel to grain (MPa)			40.8	46.7	50.1	37.8	33.9	45.9
	Compression perpendicular to grain (MPa)			3.6	4.5	6.0	4.1	3.4	4.7
	Shear (MPa)			7.5	6.5	9.5	9.2	5.6	9.2
	Cleavage (N/mm)			36.8	37.5	38.9	38.0	25.4	45.4
	Dimensional stability (Shrinkage % green to O.D.)	Tangential		9.2	7.8	7.4	7.8	4.5	6.0
	Radial		4.4	4.2	4.8	4.6	2.1	3.7	
	Hardness (N)		1820	2740	2990	2200	1470	2510	
Durability	Natural durability (approx. life in contact with ground)	>10 yrs	≤ 10 yrs	○	○	♦	○	♦	♦
	Treatability (preservatives or fire)	permeable – moderately resistant	resistant – extremely resistant	♦	♦	○	○	○	○
Drying	Drying rate	rapid-moderate	fairly slow-very slow	♦	♦	♦	♦	○	○
	Tendency to check during drying	absent or easily controllable	controllable with some care	♦	♦	♦	♦	♦	♦
	Tendency to distortion during drying	absent-slight	moderate	♦	○	♦	♦	♦	♦
Workability	Machining (planing/turning/moulding/mortising/boring, etc.)	good-excellent	fair	♦	♦	♦	♦	♦	♦
	Blunting	very little/slight-little/slight	moderate	♦	♦	○	♦	♦	♦
	Nailing/resistance to splitting	well-excellent	poor-satisfactory	♦	♦	♦	♦	♦	♦
	Screw/nail holding	good-excellent	satisfactory	♦	♦	♦	♦	○	♦
	Gluing	w/out difficulty exceptional	difficult satisfactory	♦	♦	♦	♦	♦	♦
Finishing	Natural colour - whitsh <sup>1</sup> , creamy wht <sup>2</sup> , lt. buff <sup>3</sup> , pale/lt. yellw <sup>4</sup> , yellwsh <sup>5</sup> , yellwsh-brn <sup>6</sup> , pnksh <sup>7</sup> , redsh wht <sup>8</sup> , salmon <sup>9</sup> , pnkshyellow <sup>10</sup> , red <sup>11</sup> , cherry rd <sup>12</sup> , dp rd <sup>13</sup> , mahogany <sup>14</sup> , pnk-brn <sup>15</sup> , orng <sup>16</sup> , dk chocolate brn <sup>17</sup> , lt. brn <sup>18</sup> , pale rdsh brn <sup>19</sup> , orng-wht <sup>20</sup>			1, 3, 6	1, 6	4, 8, 11, 13	2, 4, 7, 10, 16	9, 17, 15	1, 5
	Paint finishing	good-excellent	poor-satisfactory	♦	♦	○	○?	♦	♦
	Stain finishing	good-excellent	poor-satisfactory	♦	♦	○	♦	♦	♦
	Tendency to resin exudation	Absent or infrequent after drying	Acceptability depends on finish to be used and visual standards required	♦	♦	○	♦	♦	♦
Misc. Properties	Tendency to corrode ferrous metals	Likely	Unlikely	○	○	○	○	♦	♦
	Becomes stained in contact with ferrous metals	Likely	Unlikely	○	○	○	○	♦	♦

# Commercial enquiries and requests for information

Quality assured Douglas fir is widely available in domestic and export markets. The Coast Forest Products Association (Coast Forest) is committed to prompt customer referral. Upon receipt, bona fide commercial enquiries and requests for other information are immediately forwarded to Coast Forest members who will then respond with relevant product literature and/or information regarding pricing, terms, documentation and shipping. Enquiries may be sent to Coast Forest by mail, fax, telephone, e-mail, or by referring to the website.

## Product literature

The Coast Forest Products Association (Coast Forest) publishes a library of descriptive, application, and technical literature about Douglas fir products, single copies of which are available free of charge from the office listed below.



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