

WESTERN HEMLOCK (PACIFIC COAST HEMLOCK)

Botanical Name:

Tsuga heterophylla (Raf.) Sarg.

Western hemlock is the single most plentiful tree species on the coast of British Columbia. It grows along both the east and west sides of the Coast Range, from sea level to mid-elevations, as well as in the Interior wet belt west of the Rocky Mountains. On average it typically grows 30 to 50 metres tall and 1 to 1.5 metres in diameter. It seldom grows in pure stands, and is usually mixed with Douglas-fir, amabilis fir, Sitka spruce, and western red cedar. Hemlock can regenerate well under a closed canopy. Hemlock makes up 17.7% of the volume of British Columbia's total growing stocks.

Common Uses

Western hemlock is commonly sold and shipped together with amabilis fir under the name Hem-Fir (also often referred to as Hem-Bal). Western hemlock is used for general construction, roof decking and plywood. It is used for laminating stock and the production of glue laminated and solid beams. Hemlock can also be used for pulp and newsprint.

Western hemlock is firmly established as an outstanding wood for mouldings and is also used for interior woodworking. Other uses include: doors, windows, interior finish, floors, suspended ceilings, ladders, and other purposes where a high-grade softwood is needed.



WESTERN HEMLOCK

Western hemlock 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	420
	Air Dry	429
SPECIFIC GRAVITY (12% M.C.)	Standard	0.42
HARDNESS (N)	Side	2740
	End	4410
MOE (Mpa)	Green	10200
	Air Dry	12300
MOR (Mpa)	Green	48.0
	Air Dry	81.1
COMPRESSION PARALLEL (Mpa)	Air Dry	46.7
COMPRESSION PERPENDICULAR (Mpa)	Air Dry	4.53
SHEAR (Mpa)	Air Dry	6.48
CLEAVAGE (N/mm Width)	Air Dry	37.5
SHRINKAGE OD = oven dry air = air dry 12%	Radial (OD)	5.4%
	Tangential (OD)	8.5%
	Volumetric (OD)	13.0%
	Volumetric (air)	8.1%
	Tang / Rad ratio	1.6

VISUAL PROPERTIES	
COLOUR	
Heartwood	Pale brown with a purplish tinge.
Sapwood	Nearly white to pale brown.
Heartwood / Sapwood Contrast	The sapwood, which is sometimes lighter in colour than the heartwood, is generally not more than 2.5 cm wide.
Latewood / Earlywood Contrast	Growth-rings are less prominent than those of Douglas-fir. The darker-coloured latewood bands have a reddish or purple cast and are distinct from the earlywood.
GRAIN	
Wood is straight-grained, fairly even in texture, and somewhat lustrous.	
FIGURE	
Plainsawn lumber or rotary-cut veneer: Distinct, inconspicuous growth ring. Quartersawn lumber or quarter-sliced veneer: Faint growth ring stripe.	
KNOTS	
Contains small, sound black knots that are usually tight and dimensionally stable.	
OTHER	
Wood is non-resinous. "Birdpecks", or small bark pockets, and dark streaks are often found in the lumber. May contain ring shake.	



WORKING PROPERTIES

Western hemlock has a relatively good strength-to-weight ratio and is known for its working properties. The wood requires special care when drying but yields a quality product. Western hemlock is known for its even density which provides for excellent machining properties. It turns, planes and shapes well and can be sanded to a smooth finish. The wood glues satisfactorily, has moderate nail and screw holding ability, and takes a good finish.

PROCESS	PERFORMANCE	COMMENTS
MACHINING		
Planing	Fair to good results	Typical defects: Fuzzy grain, raised grain, and chip marks.
Turning	Good surface quality	Easy. Good results.
Sawing	Easy to difficult	Varies from difficult to easy. Slight to moderate blunting effect.
Boring	Good	Responds well to boring operations.
Mortising	Good	Easy. Finishes well.
Shaping	Moderate shaping quality	Easy, with moderate surface quality.
Veneering	Good	
Sanding	Good	Good sanding finish.
FASTENING		
Screwing	Moderate	Intermediate holding. Tendency to split. Good results if pre-drilled. Average screw retention: 470 lb.
Lateral Nail Holding	Good	Tendency to split.
Nail Retention	Good	
Gluing	Glues satisfactorily	
FINISHING		
Staining	Average to good	Old-growth: Smooth texture achieved. As stain gets darker, prominent wild grain is visible. A wash coat would even out the colour. Second-growth: Stainability is average for light colours, poor for dark. Best finish is with light stain or clear finish followed by nitrocellulose alkyd clear sealer and finish.
Painting	Average to good paint holding ability	Satisfactory paint holding ability.
Lacquering	Good	Old-growth: Natural finish (clear coat) looks best. Satisfactory results. Second-growth: Excellent results with clear coat.
Waxing	Good	Good results. Best results are obtained when using light coloured waxes (e.g. Mellow Pine).
DRYING		
Ease of Drying	Moderately easy to moderately difficult	There is a wide variation in the moisture content of green western hemlock. Best results are obtained when sorting by moisture content is done. Due to the high moisture content of this wood, longer kiln drying times are required. When dried at high temperatures sapwood can turn a brownish colour.
DURABILITY		
Natural Decay Resistance	Slightly durable	Not appropriate for prolonged outdoor exposure.
Treatability	Impermeable	Can be improved by incising.



Commercial Availability

Hem-Fir is primarily available as structural lumber for North America, Japan and other export markets. In North America structural grades are in accordance with the National Lumber Grades Authority (NLGA) rules for dimension lumber. Select Structural, #2 and better, and stud grades are the most common grades produced for North America, with squares being the most common Japanese product. Specialty in-house grades, lamstock and export grades such as E-120 for Japan are also marketed. Western hemlock timbers are often treated for railway ties.

Appearance grades are also produced according to NLGA rules. Clears, shop lumber and moulding stock are most common, though many potential appearance grades can be produced.

** Western hemlock grows in association with amabilis fir and is commonly marketed as structural lumber in the Hem-Fir (western hemlock - amabilis fir) species mix (also often referred to as Hem-Bal).*



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.