The two species comprising the Hem-Fir commercial group are the most abundant and important trees growing in the coastal region of British Columbia, accounting for about 60% of mature coastal forests. These species, Western hemlock (Tsuga heterophylla) and Amabilis fir (Abies amabilis), are dominant in the forest, are excellent regenerators, and thrive in mixed stands of timber throughout coastal and interior wet belt regions.

Trees of both species are shade-tolerant and prune themselves as they grow to produce a tall, branch-free trunk. In dense stands they may have a clear stem for three-quarters of their height, a natural growth characteristic that produces large amounts of Clear and Factory lumber from the log.

**Responsible timber harvesting**

All forest products companies harvesting Hem-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 Hem-Fir resource. Every company has ISO certification and many are working towards certification under other forest management certification programs.
Western hemlock and Amabilis fir are nearly identical in both visual appearance and physical properties and therefore are harvested, processed and marketed as a species group in mixed packages under the commercial designation Hem-Fir.

Both species have a fine texture and a straight uniform grain. The annual growth rings are distinct but there is little difference between the heartwood and sapwood, which makes the transition subtle and the wood quite uniform in color, ranging from creamy white to light gold.

Air drying and kiln drying are both effective ways to season Hem-Fir. Once dry, the wood is stable. It hardens gradually as it dries and ages, giving it excellent wearing qualities throughout its service life.

Hem-Fir is valued for its good working properties and can be machined easily. Stiff and straight-grained it planes smoothly without splitting to take a fine finish with a light-reflecting sheen. Hem-Fir takes and holds nails and screws firmly and is receptive to various paint and stain finishes because of its smooth, resin-free surface. It may be treated successfully with both preservative- and fire-retardant treatments. Its excellent treatability makes it a preferred species for treated wood applications where high strength and density are important.

A comprehensive tabulation of Hem-Fir’s physical properties and working characteristics and comparisons with other British Columbia coastal softwoods is shown on page 3.

Hem-Fir’s appearance and ease of finishing make it well suited for commercial installations. Its easy treatability contributes to the species’ popularity for treated wood applications. And because it takes well to fire-retardant treatment, Hem-Fir is frequently specified as panelling in public buildings such as theatres and large shopping centres.

The species’ ease of machining and finishing combined with its strength and stability in service make it suitable for windows, ladders and doors. It is used for both household step ladders as well as industrial extension ladders, and for mouldings, louvered cupboards, kitchen doors and decorative front doors.

Remanufactured products of Hem-Fir typically have straight, clean edges and smooth accurate contours. These qualities, plus the fact that the wood takes heavy wear without detriment, make it appropriate for furniture, staircase components, and other items in constant use. The uniformity and grain and color make it a common choice for finger-joined and edge-glued decorative components.

Hem-Fir’s versatility 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 Hem-Fir lumber is manufactured, graded and sorted in compliance with the provisions of the relevant domestic or foreign grading rule. Hem-Fir is readily available in the following Canadian grade classifications:

- **Clear (Knot free)**
  - No. 2 Clear and Better
  - No. 3 Clear
  - No. 4 Clear

- **Factory (Remanufactured for Clear recovery)**
  - Factory Flitch
  - Shop Flitch
  - No. 1 Shop and Better
  - No. 2 Shop
  - Moulding Stock A & B

- **Construction**
  - Light Framing
  - Structural Light Framing
  - Structural Joists and Planks
  - E 120
  - 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.
## Comparative Physical Properties of Coast Species

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th>High Range</th>
<th>Low Range</th>
<th>Hem-Fir</th>
<th>Amabilis Fir</th>
<th>Pseudotsuga menziesii</th>
<th>Pacific Coast Hemlock</th>
<th>Douglas Fir</th>
<th>Sitka Spruce</th>
<th>Picea sitchensis</th>
<th>Western Red Cedar</th>
<th>Chamaecyparis nootkatensis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density (12%-kg/m³)</td>
<td>445</td>
<td>480</td>
<td>454</td>
<td>430</td>
<td>385</td>
<td>480</td>
<td>400</td>
<td>385</td>
<td>453</td>
<td>385</td>
<td>480</td>
</tr>
<tr>
<td>Specific Gravity (12% m.c.)</td>
<td>0.39</td>
<td>0.43</td>
<td>0.49</td>
<td>0.39</td>
<td>0.34</td>
<td>0.43</td>
<td>0.39</td>
<td>0.34</td>
<td>0.43</td>
<td>0.39</td>
<td>0.43</td>
</tr>
<tr>
<td>Bending Strength (MOR) (MPa)</td>
<td>68.9</td>
<td>81.1</td>
<td>88.6</td>
<td>69.5</td>
<td>53.8</td>
<td>79.7</td>
<td>69.5</td>
<td>53.8</td>
<td>79.7</td>
<td>69.5</td>
<td>53.8</td>
</tr>
<tr>
<td>Stiffness (MOE) (x10³ MPa)</td>
<td>11.4</td>
<td>12.3</td>
<td>13.5</td>
<td>11.2</td>
<td>8.3</td>
<td>11.0</td>
<td>11.2</td>
<td>8.3</td>
<td>11.0</td>
<td>11.2</td>
<td>8.3</td>
</tr>
<tr>
<td>Compression parallel to grain (MPa)</td>
<td>40.8</td>
<td>46.7</td>
<td>50.1</td>
<td>37.8</td>
<td>33.9</td>
<td>45.9</td>
<td>37.8</td>
<td>33.9</td>
<td>45.9</td>
<td>37.8</td>
<td>33.9</td>
</tr>
<tr>
<td>Compression perpendicular to grain (MPa)</td>
<td>3.6</td>
<td>4.5</td>
<td>6.0</td>
<td>4.1</td>
<td>3.4</td>
<td>4.7</td>
<td>4.1</td>
<td>3.4</td>
<td>4.7</td>
<td>4.1</td>
<td>3.4</td>
</tr>
<tr>
<td>Shear (MPa)</td>
<td>7.5</td>
<td>6.5</td>
<td>9.5</td>
<td>9.2</td>
<td>5.6</td>
<td>9.2</td>
<td>9.2</td>
<td>5.6</td>
<td>9.2</td>
<td>9.2</td>
<td>5.6</td>
</tr>
<tr>
<td>Cleavage (N/mm)</td>
<td>36.8</td>
<td>37.5</td>
<td>38.9</td>
<td>38.0</td>
<td>25.4</td>
<td>45.4</td>
<td>38.0</td>
<td>25.4</td>
<td>45.4</td>
<td>38.0</td>
<td>25.4</td>
</tr>
<tr>
<td>Dimensional stability</td>
<td>Tangential</td>
<td>9.2</td>
<td>7.8</td>
<td>7.4</td>
<td>7.8</td>
<td>4.5</td>
<td>6.0</td>
<td>4.5</td>
<td>6.0</td>
<td>4.5</td>
<td>6.0</td>
</tr>
<tr>
<td>(Shrinkage % green to O.D.)</td>
<td>Radial</td>
<td>4.4</td>
<td>4.2</td>
<td>4.8</td>
<td>4.6</td>
<td>2.1</td>
<td>3.7</td>
<td>2.1</td>
<td>3.7</td>
<td>2.1</td>
<td>3.7</td>
</tr>
<tr>
<td>Hardness (N)</td>
<td>1820</td>
<td>2740</td>
<td>2990</td>
<td>2200</td>
<td>1470</td>
<td>2510</td>
<td>2200</td>
<td>1470</td>
<td>2510</td>
<td>2200</td>
<td>1470</td>
</tr>
</tbody>
</table>

### Durability
- Natural durability (approx. life in contact with ground): >10 yrs
- Treatability (preservatives or fire): permeable – moderately resistant
- Drying rate: rapid–moderate
- Tendency to check during drying: absent or easily controllable
- Tendency to distortion during drying: absent-slight
- Machining (planing/turning/moulding/mortising/boring, etc.): good-excellent
- Blunting: very little/slight
- Nailing/resistance to splitting: well-excellent
- Screw/nail holding: good-excellent
- Gluing: w/out difficulty

### Drying
- Jointing and heel should be kept below 0.15mm to 0.30mm.
- Recommended knife mark range is 12 to 18 marks per 25mm of feed.
- Additional information about drying and machining Hem-Fir is available from Coast Forest.

### Workability

<table>
<thead>
<tr>
<th>Moisture Content (%)</th>
<th>Cutting Angle (°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10</td>
<td>Less than 20</td>
</tr>
<tr>
<td>10-12</td>
<td>20-22</td>
</tr>
<tr>
<td>15-18</td>
<td>25</td>
</tr>
<tr>
<td>Green</td>
<td>27-35</td>
</tr>
</tbody>
</table>

1° Machines best at 15% to 18% moisture content. Recommended cutter-head angles:

### Finishing
- Natural colour: whitish, creamy wht, lt. buff, pale/lt. yellow, yellowish, yellowish-brn
- Paint finishing: good-excellent
- Stain finishing: good-excellent
- Tendency to resin exudation: Absent or infrequent after drying
- Tendency to corrode ferrous metals: Likely

### Miscellaneous Properties
- Jointing and heel should be kept below 0.15mm to 0.30mm.
- Recommended knife mark range is 12 to 18 marks per 25mm of feed.
- Additional information about drying and machining Hem-Fir is available from Coast Forest.

### Standard Angles for a Planer Cutter-head

- Note: Do not exceed 3mm depth on this face.
Commercial enquiries and requests for information

Quality assured Hem-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 Hem-Fir products, single copies of which are available free of charge from the office listed below.

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