



**Canadian  
Wood**

SPRUCE-PINE-FIR  
INTERIOR DOUGLAS FIR

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# **B.C. INTERIOR SPECIES AND LUMBER GRADES**

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BRITISH COLUMBIA





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## B.C. INTERIOR SPECIES AND LUMBER GRADES

SPRUCE-PINE-FIR | INTERIOR DOUGLAS FIR

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# Introduction

British Columbia (B.C.) is Canada's most western province. It is recognized as a global leader in sustainable forest management and provides customers around the world with a wide array of quality forest products to meet any structural or finishing application—from mass timber for multi-storey wood buildings to mouldings and cabinetry.

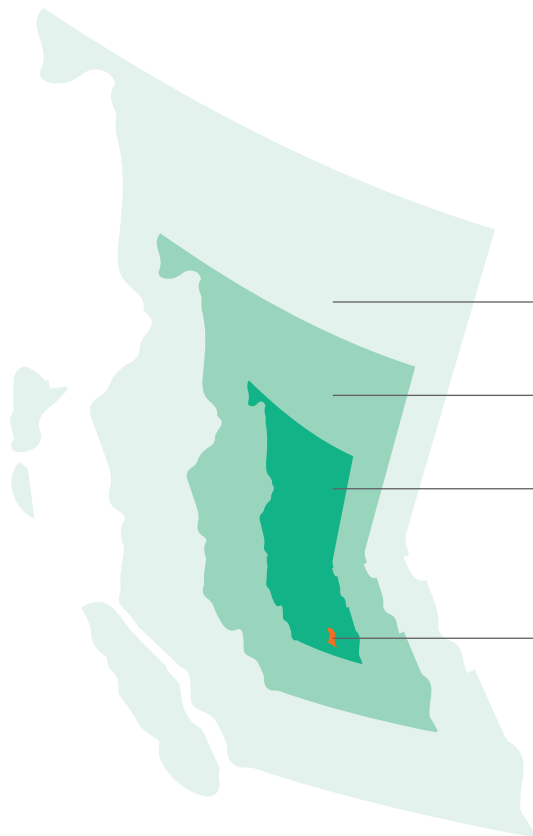
B.C.'s size and range of climates make it the most diverse province in Canada both biologically and ecologically. Its forests cover 55 million hectares in two very different regions—on the Pacific coast and in the interior. The interior region stretches 1,200 kilometres—from dry Ponderosa Pine forests in the south to the boreal forest in the north. It makes up 80% of B.C.'s forests and contributes the most value to its forest economy.

This book provides information about B.C.'s interior softwood species—Spruce-Pine-Fir (S-P-F), Douglas Fir and Western Larch. It includes grade images for common boards and structural dimension lumber.

# B.C.: A Leader in Sustainable Forest Management

B.C.'s sustainable forest management meets the environmental, social and economic needs of current and future generations. Its modern forest practices maintain a balance of forest values, including water and soil quality, fish and wildlife habitat, and biodiversity, as well as community and recreational opportunities.

B.C. maintains its forest diversity by planting native tree species in combination with natural regeneration. After harvesting on public lands, forest companies remain responsible for the site until the trees have grown into a new, healthy forest.



TOTAL AREA OF B.C.  
**95 MILLION HECTARES**

FORESTED LAND  
**55 MILLION HECTARES**

LAND AVAILABLE FOR HARVESTING  
**22 MILLION HECTARES**

ANNUAL TIMBER HARVEST  
**ABOUT 200,000 HECTARES**

## Key Facts

- One third of one percent of B.C.'s forests are harvested annually. By law, these lands are reforested promptly.
- For every tree harvested in B.C., three seedlings are planted. This results in approximately 200 million seedlings planted every year.
- B.C. has more third-party certified forests than any other jurisdiction except for Canada as a whole and Russia.
- B.C. has more than 14.1 million hectares of protected lands and a significant amount of area designated for special management where other values, such as wildlife habitat or recreation, take precedence.
- B.C. has 40 different species of native trees, including commercial species such as Western Red Cedar and Douglas Fir, which are used for a wide array of structural or finishing applications.

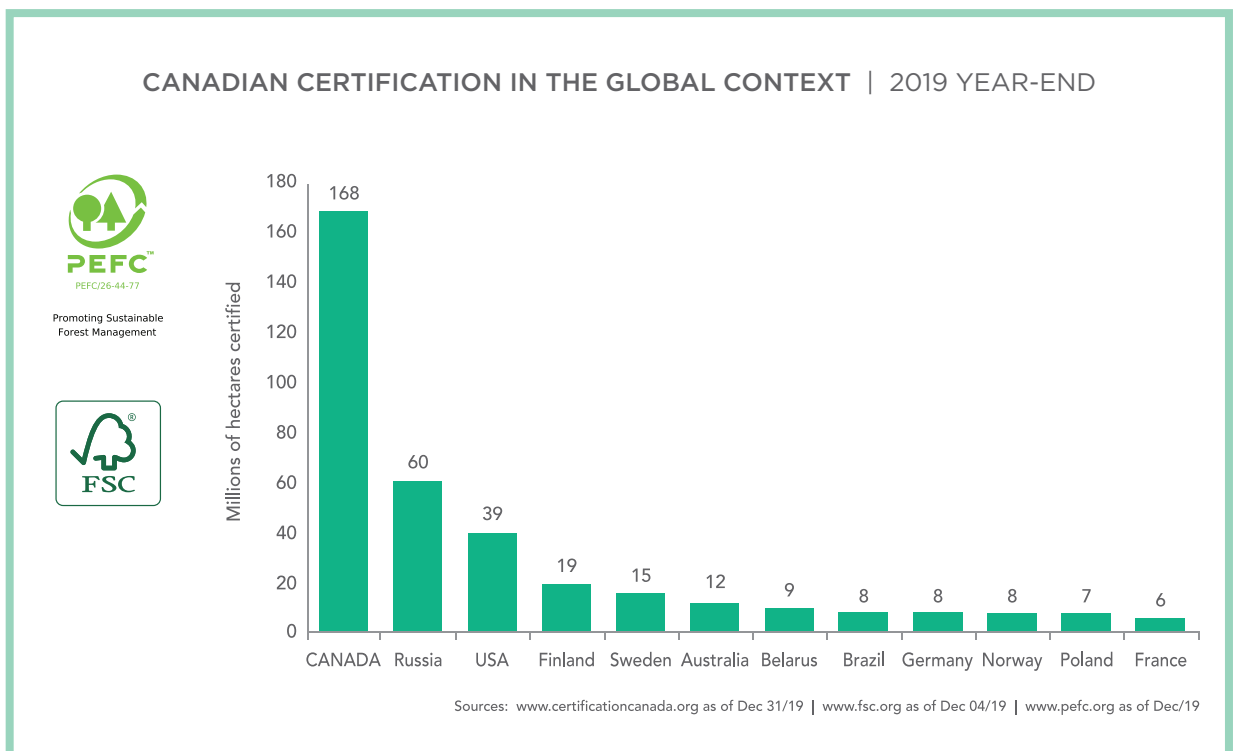


# B.C.: Legal Source of Quality Forest Products

Customers worldwide trust Canada and B.C. as a reliable supplier of forest products from legal and sustainable sources with a negligible risk of illegal logging. The province has stringent forest laws backed by well-developed enforcement regimes, skilled forestry professionals and comprehensive monitoring.

Canada is the international leader in third-party forest certification, giving customers added assurance that its products are from legal, sustainable sources. Only 10% of the world's forests are certified, 37% of these are in Canada, and B.C. contributes more than any other province.

## Third-party Forest Certification



Certification supplements B.C.'s comprehensive regulatory regime. It ensures biological diversity is maintained, timber is harvested sustainably, and wildlife habitat, soils and water resources are conserved.

At the end of 2019, B.C. had more than 50 million hectares certified to independent and globally respected certification programs—the Programme

for the Endorsement of Forest Certification (PEFC) and the Forest Stewardship Council (FSC).

Optional chain-of-custody certification tracks raw materials from certified forests and other sources through each processing or manufacturing stage until the resulting product reaches the end user.

# B.C.'s Interior Tree Species

## Spruce-Pine-Fir (S-P-F) Group

Lodgepole Pine, Interior Spruce (which includes White Spruce and Engelmann Spruce) and Subalpine Fir grow together and have similar properties so they are manufactured, grade-stamped and marketed as part of the Spruce-Pine-Fir (S-P-F) species group.

S-P-F has long been used to frame residential, commercial, industrial and agricultural structures worldwide, and it is used for joinery applications such as furniture, panelling and siding due to its small, sound and tight knots.

Its dimensional stability and superior gluing properties make S-P-F popular in the prefabrication industry. It has a high strength-to-weight ratio so it is ideal for modular houses, trusses, interior finishing, boxes and packing cases. When preservative treated, it is also ideal for exterior decking and outdoor furniture.

Most S-P-F lumber from B.C. is kiln-dried to a moisture content of 19% or less before it is shipped to increase the wood's structural integrity, appearance and workability. This also reduces shrinkage in the final application and shipping weight. Lumber can also be heat treated (HT) in a closed chamber until it reaches a core temperature of 56 degrees Celsius for at least 30 minutes to meet phytosanitary import.

## Lodgepole Pine (*Pinus contorta*)



Lodgepole Pine is the most plentiful tree species in B.C. The wood is light in colour, ranging from cream to yellow to pale reddish brown. It is straight grained and nonporous with a fine and uniform texture. It is a first-class joinery wood for furniture, windows, doors and shutters, panelling, edge-glued shelving, siding, mouldings, and other architectural millwork and joinery items.

## Subalpine Fir (*Abies lasiocarpa*)



Subalpine Fir grows throughout B.C.'s interior. It is produced predominantly as S-P-F in structural grades according to National Lumber Grades Authority (NLGA) rules for dimension lumber. Subalpine Fir is the most treatable of the S-P-F mix, and the wood is used for plywood veneers, planing-mill products, crates and boxes, sashes, doors, frames, food containers and general millwork.

## White Spruce (*Picea glauca*) and Engelmann Spruce (*Picea engelmannii*)



The wood of White Spruce and Engelmann Spruce cannot be differentiated visually. Engelmann Spruce wood is slightly denser, harder and stronger but the difference is minor.

Engelmann Spruce grows throughout the interior mountain region of B.C. and on the eastern slopes of the Rocky Mountains. It has a fine, even texture and a consistently straight grain. Numerous live, well-spaced, intergrown knots are also common.

As dimension lumber, Englemann Spruce is extremely versatile because of its high strength-to-weight ratio. It is

often used in appearance boards, interior furniture and laminated beams. Thanks to its ability to take an excellent finish, higher-grade lumber is suitable for specialty uses such as wooden musical instruments.

White Spruce is highly valued for lumber and plywood. As dimension lumber, it is extremely versatile because of its high strength-to-weight ratio. It is used for construction (framing, sheathing, roofing, sub-flooring), general millwork, interior finishing, boxes and packing cases. Its dimensional stability and superior gluing properties make it popular in the prefabrication industry.

White Spruce is used in the manufacture of modular houses, trusses, and other structural components that specify kiln-dried S-P-F wood. It is also used for medium-density fibreboard (MDF), paperboard and felt, and is a major species used in Canadian softwood plywood. Other uses of White Spruce include sounding boards in musical instruments (from select materials), food containers (because it is almost colourless and odourless when dried), paddles and oars, shelving and ladder rails.



## Douglas Fir (*Pseudotsuga menziesii*)

Douglas Fir is primarily used for building and construction purposes due to its strength advantages and availability of large dimensions. It is one of the finest timbers for heavy structural purposes, including laminated arches and roof trusses. Structurally, it is used in the form of lumber, timbers, pilings and plywood.

Douglas Fir is seen as a first-class wood for the manufacturing of sashes, doors and windows. It is also used for general millwork, flooring, furniture, cabinets, veneer, vats, ship and boat construction, transmission poles and marine pilings.

There are two varieties of Douglas Fir in B.C.—interior and coastal. The coastal species is bigger, and its wood is generally lighter in colour and more uniform in texture. Both have the same wood properties although interior Douglas Fir is less permeable to preservative treatments.

Douglas Fir 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.



## Western Larch (*Larix occidentalis*)

Western Larch makes up only 0.7% of B.C.'s total growing stock, yet it is a very important species. It produces heavy, hard and strong wood used mainly in building construction for rough dimension, small timbers, planks and boards, and for railroad crossties

and mine timbers. Western Larch is a visually appealing species, and some high-grade material is manufactured into interior finish, flooring and doors.

Most Western Larch is produced as a Douglas Fir-Larch species mix, according to National Lumber Grades Authority (NLGA) structural grades for dimension lumber.



# Lumber Grade Stamps

Grade-stamped lumber from Canada must conform to the requirements of Canadian grading rules. Virtually all manufacturers of softwood lumber in B.C. are qualified to mark their lumber with a stamp from one of several certified lumber grading agencies accredited by the Canadian Lumber Standards Accreditation Board and the American Lumber Standard Committee Board of Review.

Each piece of stamped lumber has been inspected to determine its grade and the stamp applied shows the assigned grade, the producing mill identification number, whether it was kiln dried (KD) or heat treated (HT), species or species group, the grading authority having jurisdiction over the stamp, and the grading rule used.



The following organizations and agencies can provide advice or answer questions about lumber grade marking in B.C.



Canadian Mill Services Association (CMSA)  
[www.canserve.org](http://www.canserve.org)



Canadian Softwood Inspection Agency, Inc. (CSI)  
 OR MacDonald Inspection Services (MI)  
[www.canadiansoftwood.com](http://www.canadiansoftwood.com)



B.C. Council of Forest Industries (COFI)  
[www.cofi.org](http://www.cofi.org)



Pacific Lumber Inspection Bureau (PLIB)  
 British Columbia Division  
[www.plib.org](http://www.plib.org)



Interior Lumber Manufacturers Association  
[www.irma.com](http://www.irma.com)





# Lumber Grades

This book illustrates the most commonly produced and exported lumber grades in boards and structural dimension lumber from B.C.'s interior softwood species.

In most cases, S-P-F lumber from B.C. is kiln-dried to a moisture content of 19% or less before it is shipped to increase structural integrity, appearance workability and to reduce shipping weight. Lumber can also be heat treated to meet phytosanitary import requirements.



## Common Boards

Common boards are produced with an emphasis on appearance. They are graded from the best face, and the reverse face is allowed to be one grade lower.

Common board grade rules are based on what is called a "Basic Size" (1"x 8"x 12'). When characteristics are listed as applying to Basic Size, the number and extent of the same characteristics in larger and smaller pieces may vary in proportion to the size of the piece.

## No. 3 Common Boards

No. 3 boards are used when a combination of strength and appearance is required. They are commonly used in applications such as fencing, boxing, crating and shelving where characteristic limitations allow for enough strength to perform well for its intended use while also meeting desired appearance qualities.

## No. 4 Common Boards

No. 4 boards are used mainly for general construction purposes where appearance is not important because they are often not seen, such as in sub floors, concrete forms and roof and wall sheathing.

# Structural Dimension Lumber

Structural dimension lumber products are graded for strength, with attention to appearance quality in grades such as J Grade and Prime. Each grade has designed stress values assigned to it, based on extensive physical (destructive) testing processes. In combination grades or species, the stress values assigned are for the lowest grade or the lowest value species in the combination.

## J Grade

J Grade is a unique visual quality No. 2 & Better developed by B.C. lumber suppliers in the late 1970s to meet appearance construction lumber requirements for Japanese home builders.

It limits/restricts the amount of wane, sap/heart stain, pin/grub/teredo holes and warp. While the amount of these characteristics allowed in No. 2 & Better do not limit the serviceability or strength of the products for construction applications, they did not meet the visual requirements Japanese builders needed to satisfy their customers.

J Grade is not assigned higher-strength values than No. 2 & Better, as primary strength-limiting characteristics such as knots, slope-of-grain or shake are allowed in accordance with the No. 2.

## Prime

Prime was developed in the early 1990s when big box home-centre retailers wanted a more visually appealing product for DIY (do-it-yourself) customers who were selecting lumber for themselves. Similar to J Grade, it is a visual quality No. 2 & Better, where wane, warp and holes are restricted, and it has the same strength values as No. 2 & Better.

## No. 2 & Better

No. 2 & Better is a combination of Select Structural, No. 1 and No. 2 structural products, used in cases where it is impractical for companies to extract Select or No. 1 products. Strength values are limited to the lowest grade in the combination.<sup>1</sup>

The strength values are based on use in horizontal applications such as floor joists, rafters and lintels. These are more demanding than a vertical application such as a wall stud, so the grades generally exceed strength requirements for products used in a vertical orientation.

The quality of lumber found in the No. 2 & Better mix may vary from supplier to supplier, depending on the source of the log supply and their propensity to extract products for J Grade (generally in S-P-F products only) or Prime grade from this supply mix.

## Stud

The Stud grade was developed to recognize the unique properties required for products (generally 2x4 and 2x6) to be used as vertical wall-framing members (referred to as studs). Many characteristics are the same as No. 3 (knots, holes, decay, etc.), with restriction on characteristics which limit its serviceability, such as wane (particularly along a nailing edge), skips (especially in width) and splits.

<sup>1</sup> This is in accordance with NLGA paragraphs 124a, 124b and 124c.  
<http://nlga.org/wp-content/uploads/2016/02/NLGA-GR-2017-Section-4-Dimension-Lumber-NGR-Paras.-120-125-pgs.-65-82.pdf>

## No. 3/Utility

The No. 3/Utility allows more numerous and severe characteristics, such as larger knots, more decay and three-face shake, than allowed in the grades of No. 2 & Better. It is often used in construction for bracing, wood packaging and in products such as furniture where the pieces require a certain strength but visual characteristics are hidden. Certain undesired sections may be cut out prior to the piece being used in manufacturing finished products.

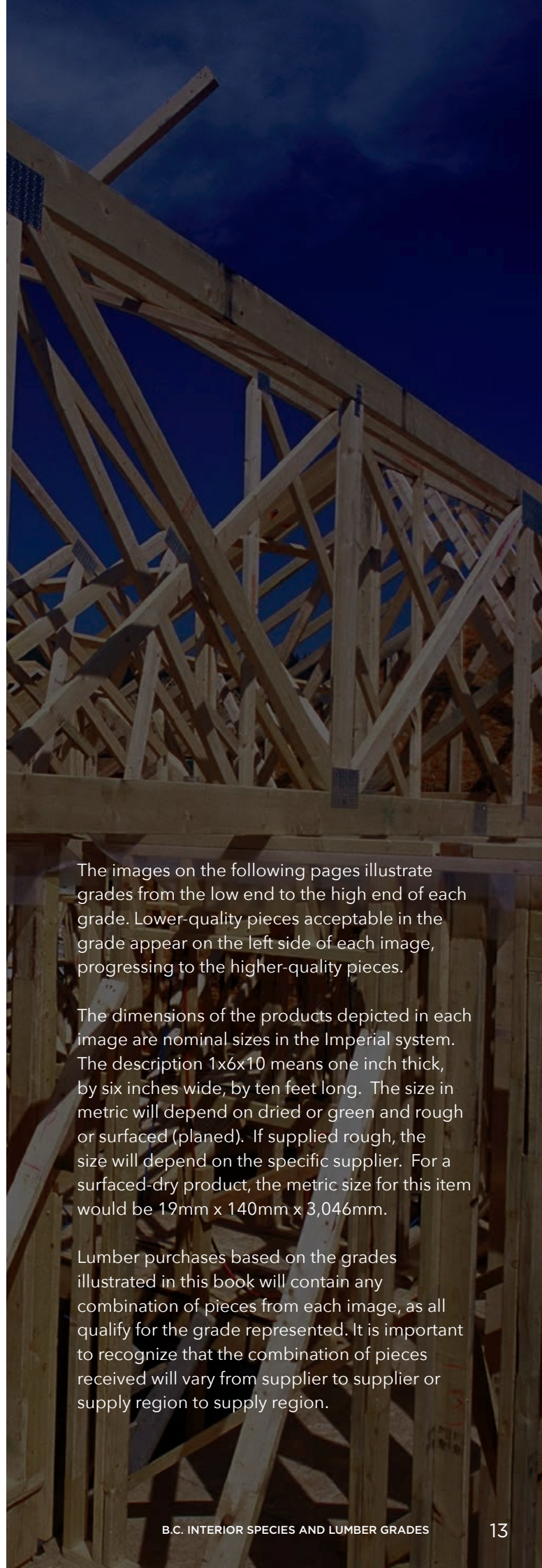
## Economy

Economy has few restrictions, as it is the last grade before pieces are considered unusable and either extensively trimmed back or chipped.

This grade most often uses the rule of "3/4 the cross section." This term refers to the fact that 75% of the cross section of a given width may be compromised, so long as 25% is still intact. For example, knots and holes may be 3/4 the cross section of the given width of the piece under consideration. Decay may be 3/4 the cross section of the given width.

Most mills in the B.C. Interior do not affix a grade stamp to Economy lumber. This allows for more severe characteristics to be included in the grade, since it is technically considered unstamped lumber.

Although it may not have a grade stamp, Economy lumber may be stamped as KD-HT so it satisfies phytosanitary requirements and qualifies for export into offshore markets. An Economy lumber package may also contain higher-grade pieces that did not satisfy the maximum 19% moisture content required in lumber stamped KD-HT.



The images on the following pages illustrate grades from the low end to the high end of each grade. Lower-quality pieces acceptable in the grade appear on the left side of each image, progressing to the higher-quality pieces.

The dimensions of the products depicted in each image are nominal sizes in the Imperial system. The description 1x6x10 means one inch thick, by six inches wide, by ten feet long. The size in metric will depend on dried or green and rough or surfaced (planed). If supplied rough, the size will depend on the specific supplier. For a surfaced-dry product, the metric size for this item would be 19mm x 140mm x 3,046mm.

Lumber purchases based on the grades illustrated in this book will contain any combination of pieces from each image, as all qualify for the grade represented. It is important to recognize that the combination of pieces received will vary from supplier to supplier or supply region to supply region.

# SPRUCE-PINE-FIR

NO. 3 COMMON & BETTER

1x6x10





# SPRUCE-PINE-FIR

NO. 4 COMMON

1x6x10



# SPRUCE-PINE-FIR

J GRADE

2x4x10



# SPRUCE-PINE-FIR

J GRADE

2x6x10



# SPRUCE-PINE-FIR

J GRADE

2x10x10



# SPRUCE-PINE-FIR

PRIME

2x4x10



**SPRUCE-PINE-FIR**

PRIME

2x6x10



# SPRUCE-PINE-FIR

PRIME

2x10x10



# DOUGLAS FIR

PRIME

2x4x10





# DOUGLAS FIR

PRIME

2x6x10



# DOUGLAS FIR

PRIME

2x10x10



# SPRUCE-PINE-FIR

NO. 2 & BETTER

2x4x10



# SPRUCE-PINE-FIR

NO. 2 & BETTER

2x6x10



# SPRUCE-PINE-FIR

NO. 2 & BETTER

2x10x10



# DOUGLAS FIR

NO. 2 & BETTER

2x4x10



**DOUGLAS FIR**

NO. 2 & BETTER

2x6x10



# DOUGLAS FIR

NO. 2 & BETTER

2x10x10





**SPRUCE-PINE-FIR**

STUD

2x4x8



# SPRUCE-PINE-FIR

STUD

2x6x9



**DOUGLAS FIR**

STUD

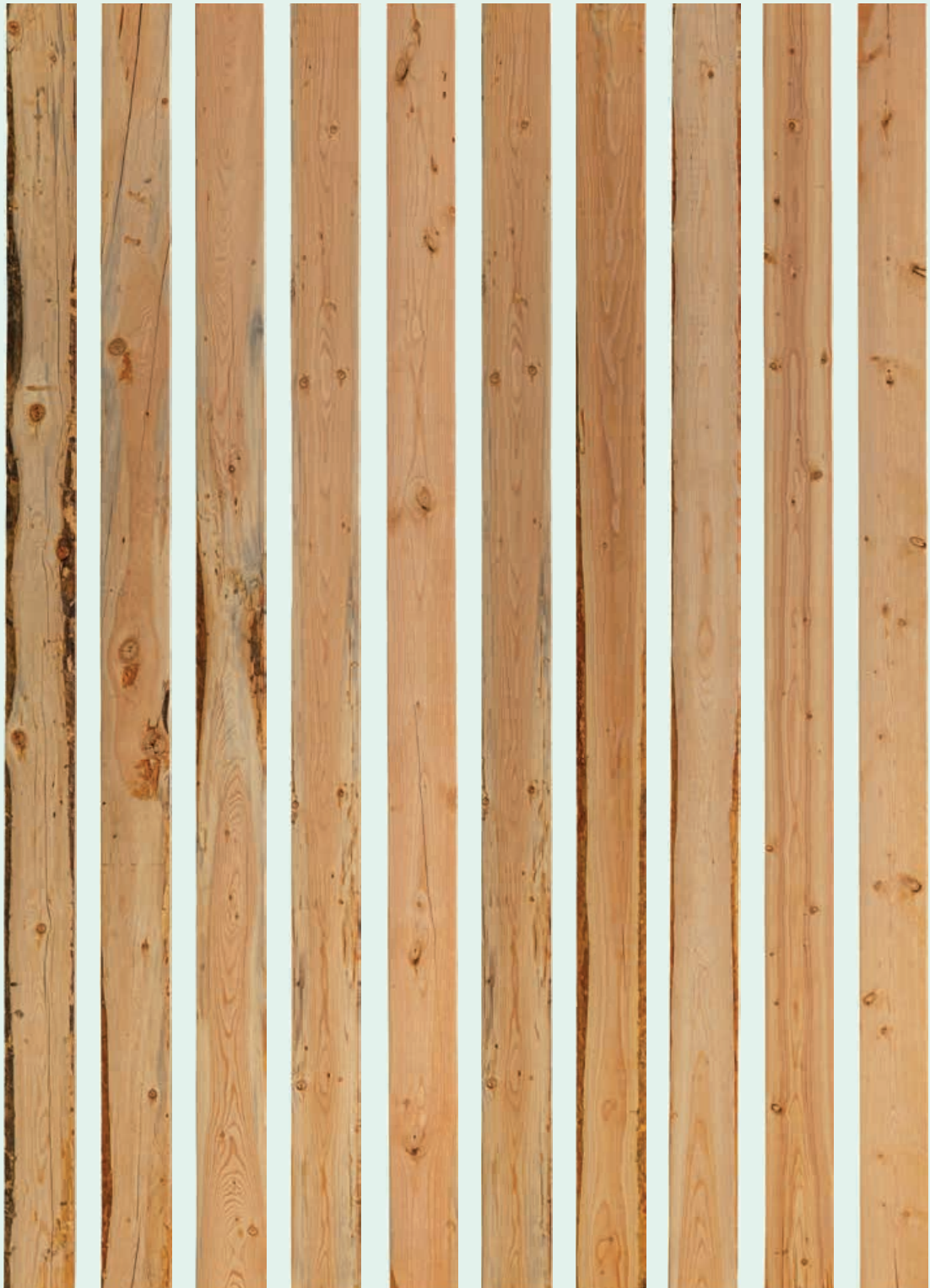
2x4x8



## DOUGLAS FIR

STUD

2x6x9



**SPRUCE-PINE-FIR**

NO. 3

2x4x10



# SPRUCE-PINE-FIR

NO. 3

2x6x10



**SPRUCE-PINE-FIR**

NO. 3

2x10x10



# DOUGLAS FIR

NO. 3

2x4x10





# DOUGLAS FIR

NO. 3

2x6x10



# DOUGLAS FIR

NO. 3

2x10x10



**SPRUCE-PINE-FIR**

ECONOMY

2x4x10



# SPRUCE-PINE-FIR

ECONOMY

2x6x10



**DOUGLAS FIR**

ECONOMY

2x4x9



# Resources/Information

Forestry Innovation Investment (FII) is a crown agency of the government of British Columbia (B.C.), the westernmost province of Canada. Our international market offices are supported by the Canadian federal government through Natural Resources Canada (NRCan) to promote B.C., Canada as a global supplier of quality, environmentally responsible wood products and sustainably managed forests. Through seminars, exhibitions, networking events and media channels under the Canadian Wood and Canada Wood names, our teams are creating awareness about B.C. wood products and the benefits of wood use in various applications. Wood experts assist leading manufacturers, builders/developers, architects and interior designers in identifying the right species and appropriate grades of Canadian wood for their projects. Business development teams support their respective market's wood importers by identifying and connecting them with B.C. lumber companies for a steady supply of Canadian wood species.

To learn more about wood species and lumber grades in your market please visit us at:

Canadian Wood Vietnam: [www.canadianwood.com.vn](http://www.canadianwood.com.vn)

Canadian Wood India: [www.canadianwood.in](http://www.canadianwood.in)

Canada Wood China: [www.canadawood.cn](http://www.canadawood.cn)

Canada Wood Japan: [www.canadawood.jp](http://www.canadawood.jp)

Canada Wood Korea: [www.canadawood.or.kr](http://www.canadawood.or.kr)



Forestry Innovation  
Investment



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Produits de bois canadien

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[suppliers.naturallywood.com](http://suppliers.naturallywood.com)





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