Family: PINACEAE (gymnosperm)
Scientific name(s): Abies alba
Abies pectinata (synonymous)
Commercial restriction: no commercial restriction

Note: European species, FIR appreciates cool climates where atmospheric humidity is high.
In France, COMMON SPRUCE (Picea excelsa) is often falsely called "SAPIN" (Abies alba).

WOOD DESCRIPTION

Color: creamy white
Sapwood: not demarcated
Texture: medium
Grain: straight
Interlocked grain: absent

Note: FIR wood is creamy white, a little bit dull, sometimes slightly reddish-brown. Rings are well visible. Texture is fine to medium according to growing speed.

LOG DESCRIPTION

Diameter: from 50 to 80 cm
Thickness of sapwood:
Floats: pointless
Log durability: moderate (treatment recommended)

PHYSICAL PROPERTIES

Specific gravity *:
Monnin hardness *:
Coefficient of volumetric shrinkage:
Total tangential shrinkage (TS):
Total radial shrinkage (RS):
TS/RS ratio:
Fiber saturation point:
Stability: moderately stable

Mean
0.49
2.5
0.44 %
8.7 %
4.0 %
2.2
29 %

Std dev.
0.05
0.7
0.07 %
2.3 %
1.1 %

MECHANICAL AND ACOUSTIC PROPERTIES

Crushing strength *:
Static bending strength *:
Modulus of elasticity *:
Musical quality factor: 71.4 measured at 2928 Hz

Mean
41 MPa
80 MPa
14300 MPa

Std dev.
3 MPa
9 MPa
3000 MPa

(*) at 12% moisture content, with 1 MPa = 1 N/mm²

NATURAL DURABILITY AND TREATABILITY

Fungi and termite resistance refers to end-uses under temperate climate. Except for special comments on sapwood, natural durability is based on mature heartwood. Sapwood must always be considered as non-durable against wood degrading agents.

E.N. = Euro Norm

Funghi (according to E.N. standards): class 4 - poorly durable
Dry wood borers: susceptible
Termites (according to E.N. standards): class 5 - susceptible
Treatability (according to E.N. standards): class 2-3 - poorly to moderately permeable
Use class ensured by natural durability: class 1 - inside (no dampness)
Species covering the use class 5: No

Note: This species is listed in the European standard NF EN 350-2.
Prone to blue stain. FIR wood is used with sapwood. Hence a preservative treatment is imperative.

REQUIREMENT OF A PRESERVATIVE TREATMENT

Against dry wood borer attacks: requires appropriate preservative treatment
In case of risk of temporary humidification: requires appropriate preservative treatment
In case of risk of permanent humidification: use not recommended
DRYING

Drying rate: rapid
Risk of distortion: high risk
Risk of casehardening: no
Risk of checking: high risk
Risk of collapse: no

Possible drying schedule: 3

<table>
<thead>
<tr>
<th>M.C. (%)</th>
<th>Temperature °C</th>
<th>Air humidity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>dry-bulb</td>
<td>wet-bulb</td>
</tr>
<tr>
<td>Green</td>
<td>60</td>
<td>56</td>
</tr>
<tr>
<td>30</td>
<td>68</td>
<td>58</td>
</tr>
<tr>
<td>20</td>
<td>74</td>
<td>60</td>
</tr>
<tr>
<td>15</td>
<td>80</td>
<td>61</td>
</tr>
</tbody>
</table>

This schedule is given for information only and is applicable to thickness lower or equal to 38 mm.
It must be used in compliance with the code of practice.
For thickness from 38 to 75 mm, the air relative humidity should be increased by 5 % at each step.
For thickness over 75 mm, a 10 % increase should be considered.

SAWING AND MACHINING

Blunting effect: normal
Sawteeth recommended: ordinary or alloy steel
Cutting tools: ordinary
Peeling: good
Slicing: not recommended or without interest

Note: The quality of surface depends on the grain regularity and the possible presence of knots or areas of compression wood.

ASSEMBLING

Nailing / screwing: poor
Gluing: correct

Note: FIR wood tends to split. Risk of split when nailing.

COMMERCIAL GRADING

Appearance grading for sawn timbers: According to European standard EN 1611-1 (October 1999)
Possible grading (on 2 sides): G2-0, G2-1, G2-2, G2-3, G2-4
Possible grading (on 4 sides): G4-0, G4-1, G4-2, G4-3, G4-4

Visual grading for structural applications: Traded timber with CE marking. Possible strength classes: C18, C24 or C30 related to the European standard EN 14081 (May 2006).

FIRE SAFETY

Conventional French grading:
Thickness > 18 mm: M.3 (moderately inflammable)
Thickness < 18 mm: M.4 (easily inflammable)
Euroclasses grading: D s2 d0
Default grading for solid wood, according to requirements of European standard EN 14081-1 annex C (April 2009). It concerns structural graded timber in vertical uses with mean density upper 0.35 and thickness upper 22 mm.

END-USES

Heavy carpentry
Wood frame house
Pit props
Interior panelling
Moulding
Fiber or particle boards
Boxes and crates
Musical instruments

Light carpentry
Poles
Glued laminated
Interior joinery
Current furniture or furniture components
Pulp
Shingles
## MAIN LOCAL NAMES

<table>
<thead>
<tr>
<th>Country</th>
<th>Local name</th>
<th>Country</th>
<th>Local name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany (temperate timber)</td>
<td>TANNE</td>
<td>Spain (temperate timber)</td>
<td>ABETE COMUN</td>
</tr>
<tr>
<td>France (temperate timber)</td>
<td>SAPIN</td>
<td>Italia (temperate timber)</td>
<td>ABETE</td>
</tr>
<tr>
<td>United Kingdom (temperate timber)</td>
<td>FIR</td>
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### SAPIN

<table>
<thead>
<tr>
<th>Specific gravity</th>
<th>0.2</th>
<th>0.3</th>
<th>0.4</th>
<th>0.5</th>
<th>0.6</th>
<th>0.7</th>
<th>0.8</th>
<th>0.9</th>
<th>1</th>
<th>1.1</th>
<th>1.2</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Very light</td>
<td>Light</td>
<td>Medium</td>
<td>Heavy</td>
<td>Very heavy</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Monnin hardness</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Very soft</td>
<td>Soft</td>
<td>Medium</td>
<td>Hard</td>
<td>Very hard</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Coefficient of volumetric shrinkage (%)</th>
<th>0.3</th>
<th>0.5</th>
<th>0.7</th>
<th>0.9</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total tangential shrinkage (%)</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Total radial shrinkage (%)</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Crushing strength (MPa)</th>
<th>0</th>
<th>20</th>
<th>40</th>
<th>60</th>
<th>80</th>
<th>100</th>
<th>120</th>
<th>140</th>
<th>160</th>
<th>180</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Static bending strength (MPa)</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
<th>125</th>
<th>150</th>
<th>175</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Modulus of elasticity (<1000 MPa) | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                                   | Low | Medium | High |

### Resistance to Fungi
- Not durable
- Poorly durable
- Moderately durable
- Durable
- Very durable

### Resistance to Dry Wood Insects Borer
- Susceptible
- Durable

### Resistance to Termites
- Susceptible
- Moderately durable
- Durable

### Treatability
- Not permeable
- Poorly permeable
- Moderately permeable
- Easily permeable

### Stability
- Poorly stable
- Moderately stable
- Stable

### Fibers Saturation Point
- 15 % Low
- 25 % Medium
- 35 % High
- 45 %