Grading

of sawn timber in Europe according to EN 1611-1



Terms and definitions, methods of measurement and requirements Features according to tables Tables

SWEDISH WOOD™

Preface

Since the mid 1980s the European standardizing organizations and the European timber industry have been deeply committed in producing standards for definitions, testing, classification etc of timber products in order to facilitate trading. This has been done under the auspices of the European standardizing committee CEN, Comité Européen de Normalisation, and also, for so called harmonized standards, the European Union.

For sawn timber uniform grading rules are very important and this actual standard EN 1611-1 will hopefully replace old national grading rules and ultimately be used for most of the trading of appearance graded timber in Europe.

Stockholm, October 2016

Johan Fröbel Swedish Wood

Terms and definitions. methods of measurement and requirements 4

Species 4

Sawing patterns 5

Four piece cut with centre cut 5 Four piece cut with pith catcher 6 Through cut with centre cut, edged 6 Through cut with pith catcher, edged 7

Size 8

Dimension 8 Thickness 8 Width 9 Face width 9 Lenath 10

Permitted deviations for thickness, width and length of sawn timber 10

Moisture content 11

Location on piece 12

Side of the piece of timber 12

Features according to table 1 14

Knot condition 15

Sound, intergrown knot 15 Partially intergrown knot / Dead knot 15 Encased knot 15 Unsound knot 16 Loose knot 16

Knot shape 17 Round knot 18

Oval knot 19 Traversing edge knot 20 Not traversing arris knot 21 Traversing arris knot 22 Spike knot 23

Splay knot 24 Pin knot 25 Knot cluster 26

Features according to table 2 27

Other natural features 27

Bark pocket 28 Resin pocket 29 Resin wood 30 Reaction wood (Compression wood) 31 Slope of grain 32

Curly grain 33 Top rupture 34 Pith 35

Attacks of micro-organisms

and insects 36 Dote 37 Soft rot 38 Surface blue stain 39 Deep blue stain 39

Insect attack 40

Features according to table 3₄₁

Production related features 42

Wane 42

Fissures 43 Check 43 End shake 44

Warp 45 Bow 45 Spring 45 Twist 46

Cup 46 Tables 47

Table 1 48 Table 2 49 Table 3 50

Trading qualities – grades 51

References 55 Disclaimer 56 Keywords 57

Terms and definitions, methods of measurement and requirements

Species

Conifers – Definition

Timber from trees in the botanical group gymnosperms. Pine – *Pinus sylvestris*.

Spruce - Picea abies.

Fact How can you distinguish between pine and spruce?

- The heartwood in pine is darker than the sapwood and clearly visible.

 The heartwood and sapwood in spruce have the same colour when the wood is dry and therefore you cannot see the heartwood in dry timber.
- There are often small pin knots between the branch whorls in spruce but not in pine. The knots in pine are often oval.
- In planed spruce timber there is often chipped grain around the knots. It is easier to plane pine timber without getting chipped grain.
- There are often resin pockets in spruce but very seldom in pine.

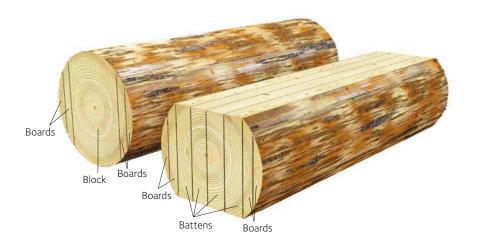
Sawing patterns

The sawing patterns described below are the desired cuts through a log. Because of the interior structure and the exterior form of the logs variations can occur.

Four piece cut with centre cut

Definition

First cut takes boards from the opposite sides of the log. The rest of the log (the block) is turned 90 degrees and is cut to boards and battens. The block is cut through the centre (pith). The other cuts result in centre yield and side yield. Centre yield is made up of even pieces of the same width and the same or different thickness (Nordic practice).



Sawing patterns Sawing patterns

Four piece cut with pith catcher

Definition

First cut takes boards from the opposite sides of the log. The rest of the log (the block) is turned 90 degrees and is cut to boards and battens. The block is cut so that the pith is in the middle of a batten (pith catcher). The other cuts result in centre yield and side yield. Centre yield is made up of uneven pieces of the same width and the same or different thickness.



Through cut with centre cut, edged

Definition

The log is cut by a number of parallel cuts with one cut through the pith. The resulting pieces are edged.



Through cut with pith catcher, edged

Definition

The log is cut by a number of parallel cuts of which two are cutting a piece containing the pith (pith catcher). The resulting pieces are edged.



Pith catcher

Size

- Nominal size (trading size) is used in the name of a piece of timber.
- Target size is the size specified (at the reference moisture content) and to which the deviations are to be related.
- Actual size is the size present at the time of measurement.

Target size and actual size have to be under consideration of the moisture content in the piece of timber.

Dimension

-
or thickness

Thickness

Definition	Distance between the faces of a piece of timber at the specified place of measurement.
Requirement	Thickness in mm at specified moisture content.
Measuring rule	Thickness is measured in the transverse direction near to but at least 150 mm from both ends of the piece of timber and at at least one randomly chosen point in between. Record only the smallest measured thickness.



Width

Definition	Distance between the edges of a piece of timber at the specified place of measurement.
Requirement	Width in mm at specified moisture content.
Measuring rule	Width is measured in the transverse direction near to but at least 150 mm from both ends of the piece of timber and at at least one randomly chosen point in between. Record only the smallest measured width.



Face width

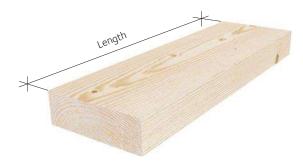
Definition	Width that is visible after final assembly.
Requirement	Width in mm at specified moisture content.
Measuring rule	Width is measured in the transverse direction near to but at least 150 mm from both ends of the piece of timber and at at least one randomly chosen point in between. Record only the smallest measured width.



Moisture content

Length

Definition	The shortest distance between the ends of a piece of timber.
Requirement	Length in mm or m at specified moisture content.
Measuring rule	Length is measured as the length of the largest possible rectangular parallelepiped that can be inscribed in the piece of timber.



Permitted deviations for thickness, width and length of sawn timber

(According to EN 1313-1:2010)

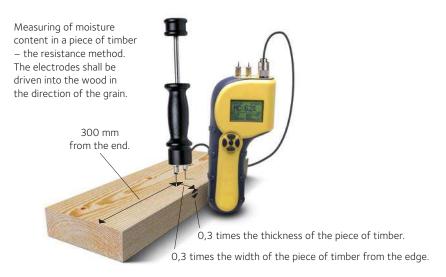
Definition	Permitted deviation from the target size.
Requirement	Permitted deviations from the target size at the reference moisture content 20 %: For thickness and width ≤ 100 mm: +3 mm / – 1 mm For thickness and width > 100 mm: +4 mm / – 2 mm
	The average thickness and the average width shall not be less than the target sizes.
	For length: minus deviations not permitted, plus deviations agreed by contract.

Example

Thickness, target size = 50 mmMaximum thickness = 50 + 3 = 53 mmMinimum thickness = 50 - 1 = 49 mm

Moisture content

Definition	Mass of water present in wood expressed as a percentage of the wood's oven dry mass.
Measuring rule	Measuring (estimation) is carried out with a calibrated electrical resistance moisture content meter with isolated hammer electrodes or with a calibrated capacitance moisture content meter.



Measuring rule: The oven dry method which is the most exact.



mass of the test piece before drying (raw mass)
– mass of the oven dry test piece (dry mass)

mass of the oven dry test piece

× 100 = moisture content in percent

Location on piece

In order to grade a piece of timber you need to be able to locate the grade requirements to a certain side of the piece, a certain part of the length or part of the cross section, for instance one edge or 10 mm of any adjacent face.

Side of the piece of timber

Face

Definition	Either of the wider longitudinal opposite surfaces of the piece of timber or any longitudinal surface if the piece is of square
	cross section.

Outside face

Definition	The face further from the pith of the log.
------------	--

Inside face

Definition	The face nearer to the pith of the log.
------------	---

Better face

Definition	The face that, when applying a particular grading rule,
	is judged to be better than the other face.

Worse face

Definition	The face that, when applying a particular grading rule,
	is judged to be worse than the other face.



Edge

Definition	Either of the narrower longitudinal opposite surfaces of
	square edged timber.

Better edge

Definition	The edge that, when applying a particular grading rule,
	is judged to be better than the other edge.

Worse edge

Definition	The edge that, when applying a particular grading rule, is judged to be worse than the other edge.

Arris

Definition	Line of intersection between an edge and a face or between
	two faces if the piece is of square cross section.

Arris between edge and outside face

Definition	Arris between edge and outside face.

Arris between edge and inside face

Definition	Arris between edge and inside face.
------------	-------------------------------------



Features according to table 1 Knot condition

Features according to table 1

Knot condition

This describes the different types of knots. The type of knot depends on how the knots have developed in the growing tree.

- Sound, intergrown knot
- Partially intergrown knot / Dead knot
- · Encased knot
- · Unsound knot
- Loose knot.

Knot shape

All knots start from the pith and extend outwards with an increasing diameter. Depending on how the saw cut passes through the knot, its shape on the surface of the timber can vary considerably. These different knot shapes require individual measuring rules and requirement formulations.

- · Round knot
- Oval knot
- Traversing edge knot
- Not traversing arris knot
- Traversing arris knot
- Spike knot
- Splay knot
- Pin knot.

Knot cluster

Definition: Knots located so that no grain recovery is evident between adjacent knots.

Knot condition



Sound, intergrown knot

Definition

Knot that, on the surface considered, is intergrown with the surrounding wood along more than 75 percent of its circumference and is free of rot.



Partially intergrown knot / Dead knot

Definition

Knot that, on the surface considered, is intergrown with the surrounding wood for more than 25 percent but less than 75 percent of its circumference (partially intergrown knot) or less than 25 percent of its circumference (dead knot).



Encased knot

Definition

Knot that is surrounded by bark for more than 75 percent of its circumference.



Definition

Knot affected by rot.



Definition

Loose knot

Dead knot that is not held firmly in the surrounding wood.

Knot shape

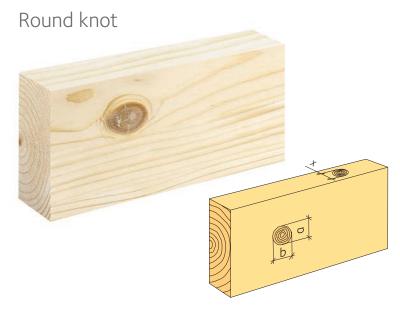
Fact Measuring rules

Knots shall be measured by their shape and location on the piece of timber. The following symbols are used for identification:

- a =smallest diameter in mm.
- b =largest diameter in mm.
- d = knot size in mm.
- x =size perpendicular to the length of the piece of timber.
- y =size parallel to the length of the piece of timber.

Knot

Definition	Portion of a branch embedded in wood.
Delilition	FOI tion of a branch embedded in wood.



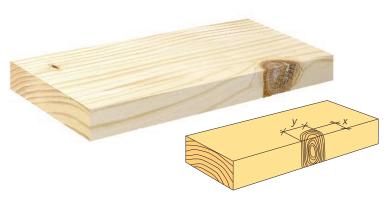
Definition	Knot cut more or less straight through so that the ratio between the largest and the smallest transverse measurement is not more than 1,5.
Requirement	Face: Maximum size = 10 percent of the width + [table value] (mm). Maximum number on worst meter.
	Edge: Maximum size in percent of thickness. Maximum number on worst meter.
Measuring rule	Face: Average value of smallest and largest diameters $d = (a + b) / 2$.
	Edge: $d = x$.





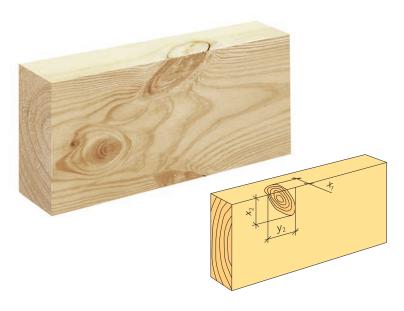
Definition	Knot cut more or less straight through so that the ratio between the largest and the smallest transverse measurement is more than 1,5 but not more than 4.
Requirement	Face: Maximum size = 10 percent of the width + [table value] (mm). Maximum number on worst meter.
	Edge: Maximum size in percent of thickness. Maximum number on worst meter.
Measuring rule	Face: Average value of smallest and largest diameters $d = (a + b) / 2$.
	Edge: $d = x$.

Traversing edge knot



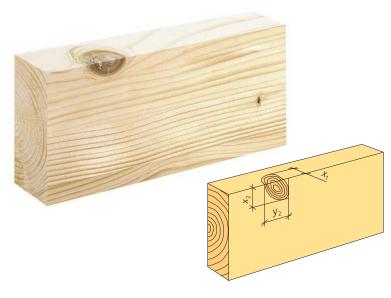
Definition	Through cut knot that runs across the edge from one face to the other.
Requirement	Face: Maximum size = 10 percent of the width + [table value] (mm). Maximum number on worst meter.
	Edge: Maximum number on worst meter.
Measuring	Face: Average value of width and length $d = (x + y) / 2$.
rule	Edge: Not to be measured.

Not traversing arris knot

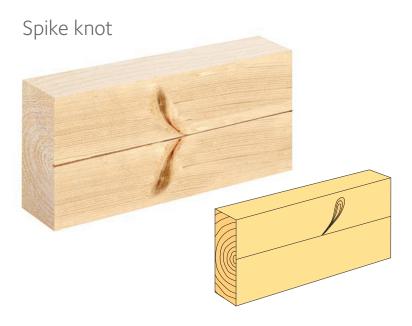


Definition	Knot that is exposed on an arris on the inside face of a piece of timber.
Requirement	Face: Maximum size = 10 percent of the width + [table value] (mm). Maximum number on worst meter.
	Edge: Maximum size in percent of thickness. Maximum number on worst meter.
Measuring rule	Face: Average value of width and length $d = (x_2 + y_2) / 2$.
	Edge: $d = x_1$.

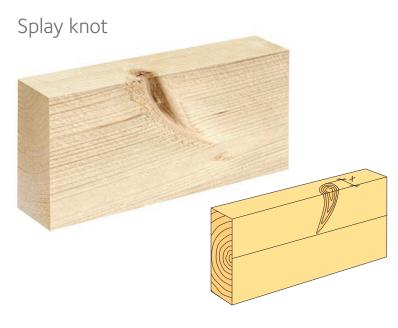
Traversing arris knot



Definition	Knot that is exposed on an arris on the outside face of a piece of timber.
Requirement	Face: Maximum size = 10 percent of the width + [table value] (mm). Maximum number on worst meter.
	Edge: Maximum size in percent of thickness. Maximum number on worst meter.
Measuring rule	Face: Average value of width and length $d = (x_2 + y_2) / 2$.
	Edge: $d = x_1$.



Definition	Knot cut so that the ratio between the largest and the smallest transverse measurement exceeds 4 and that does not reach an arris.
Requirement	Maximum number on worst meter.
Measuring rule	Not to be measured.



Definition	Knot cut through the longitudinal axis that, on the inside face, splays towards the edge/arris and is also partially exposed on the edge. The ration between the largest and the smallest transverse measurement exceeds 4.
Requirement	Face: Maximum number on worst meter.
	Edge: Maximum size in percent of thickness. Maximum number on worst meter.
Measuring	Face: Not to be measured.
rule	Edge: $d = x$.



Definition

Small, intergrown, rot-free knot, not larger than 5 mm. Not to be considered.

Knot cluster Features according to table 2

Knot cluster



Definition	Knots located so that no grain recovery is evident between adjacent knots.
	Note: Normally the distance to an adjacent knot should be less than the width of the piece of timber or less than 150 mm if the width exceeds150 mm.
Measuring rule	Knots shall be measured individually in the same way as other knots.

Features according to table 2

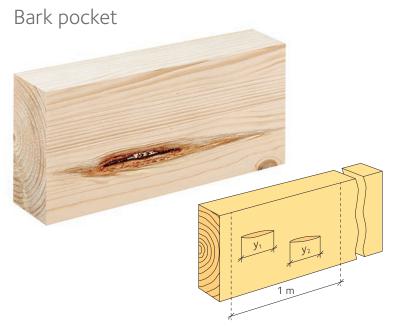
Other natural features

Some biological phenomena, so called features, in wood that have strong influence on the quality.

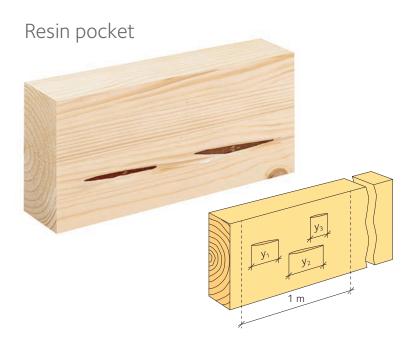
- Bark pocket
- Resin pocket
- Resin wood
- Reaction wood, so called compression wood
- Strong, abnormal grain structure:
 - Slope of grain
 - Curly grain
 - Top rupture
- Pith.

Note Resin

Definition: The task of the resin is to defend wood against micro-organisms and against drying out in the event of damage. It is stored under pressure in the wood's resin channels. When mechanical damage occurs, the resin flows and accumulates.



Definition	Bark that is partly or wholly enclosed in the wood.
Requirement	Maximum total length and maximum number on worst meter.
Measuring rule	Length y in the longitudinal axis of the piece of timber. $y = y_1 + + y_n$.

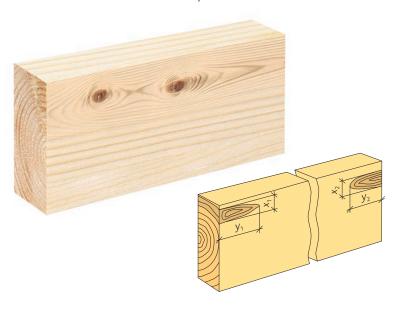


Definition	Lens-shaped cavity in the wood containing, or that has contained, resin. Depending on how the saw cuts into the cavity, the resin pocket is visible as a wide, shallow depression or as an oblong opening in the surface. Can also be a round cavity.
Requirement	Maximum total length and maximum number on worst meter.
Measuring rule	Length y in the longitudinal axis of the piece of timber. $y = y_1 + + y_n$.



Definition	Wood that has been saturated with resin. Usually darker than surrounding, normal wood. The resin wood is formed through a more dense concentration of resin channels.
Requirement	Maximum total area in percent of the area of the side.
Measuring rule	Total area on the side. $A = x_1 \cdot y_1 + + x_n \cdot y_n$.

Reaction wood (Compression wood)



Definition	Wood with a distinctive anatomical character with different properties, which normally occurs in crooked or leaning trees and in branches. Most distinctive are very large moisture movements in the grain direction.
Requirement	Maximum total area in percent of the area of the side.
Measuring rule	Total area on the side. $A = x_1 \cdot y_1 + + x_n \cdot y_n$.

Slope of grain



Definition	Divergence in the direction of the grain in relation to the longitudinal axis of the piece of timber. Does not refer to disruption of the grain around knots or other local deviations.
Requirement	Not permitted / permitted.



Definition	Grain that follows tight, irregular curves.
Requirement	Not permitted / permitted.



Definition	Grain deviation caused when a leading shoot breaks and a side shoot takes over its role, after which everything is gradually encased by the increasingly thick stem. Depending on the location of the saw cut in the log, the top rupture is either clear and illustrative on the surface of the piece of timber or if it is deeper down, when it is only possible to see a rough yet diffuse disturbance in the grain. Often to be found in connection with curly grain and rot.
Requirement	Not permitted / permitted.



Definition	Zone within the first growth ring that consists chiefly of soft tissue. Dark colour.
Requirement	Not permitted / permitted.

Attacks of microorganisms and insects

Refers to attacks of fungus, bacteria and insects.

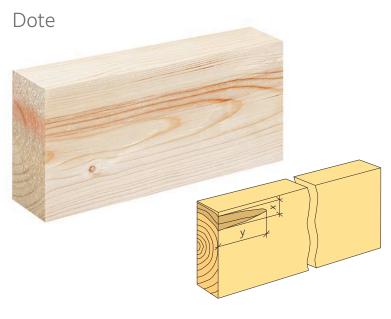
- Dote
- Soft rot
- Surface blue stain
- Deep blue stain
- Insect attack.

Note Rot

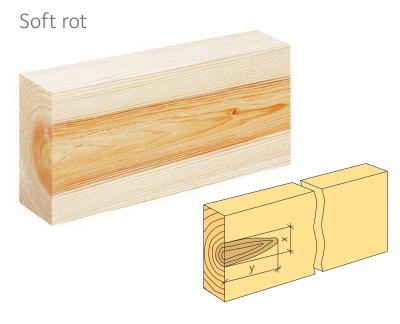
Definition	Decomposition of wood due to fungi or other micro-organisms
	resulting in softening, progressive loss of strength and mass,
	and often changes in colour and texture.

Note Blue stain

Definition	Stain caused by fungi, where the discolouration ranges from
	pale blue to black, usually in sapwood.

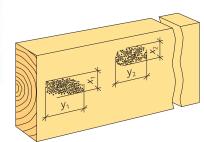


Definition	Early stage of rot, characterized by discoloured streaks or patches (often at knots) in the wood. The general texture and strength properties remain more or less unchanged.
Requirement	Maximum total area in percent of the area of the side.
Measuring rule	Total area on the side. $A = x_1 \cdot y_1 + + x_n \cdot y_n$.



Definition	The wood has been attacked by rot and has lost its firmness. It gives way to pressure.
Requirement	Maximum total area in percent of the area of the side.
Measuring rule	Total area on the side. $A = x_1 \cdot y_1 + + x_n \cdot y_n$.

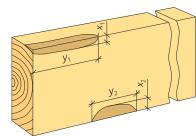




Definition	Superficial blue stain, less than 2 mm deep, that can be removed by surface planing.
Requirement	Maximum total area in percent of the area of the side.
Measuring rule	Total area on the side. $A = x_1 \cdot y_1 + + x_n \cdot y_n$.

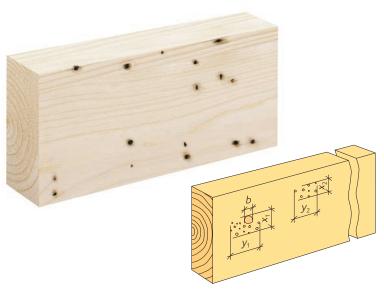
Deep blue stain





Definition	Blue stain, more than 2 mm deep, that cannot be removed by surface planing. Normally found in the log even before sawing (log blue stain).
Requirement	Maximum total area in percent of the area of the side.
Measuring rule	Total area on the side. $A = x_1 \cdot y_1 + + x_n \cdot y_n$.

Insect attack



Definition	Bore holes or pinholes in wood caused by insects or insect larvae.
Requirement	Maximum diameter and maximum total damaged area in percent of the area of the side.
Measuring rule	Maximum diameter b , total damaged area on the side. $A = x_1 \cdot y_1 + + x_n \cdot y_n$.

Features according to table 3

Production related features

• Wane.

Fissures

- Check:
- Not traversing
- Traversing (Split)
- End shake.

Warp

- Bow
- Spring
- Twist
- Cup.

Note Fissure

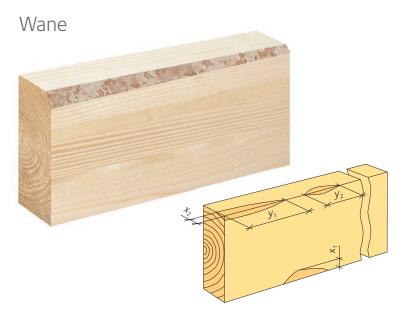
Definition	Opening between the wood cells resulting in longitudinal separation of fibres.
------------	--

Note Warp

Definition	Distortion of a piece of timber in the process of conversion and/or drying and/or storage.	
------------	--	--

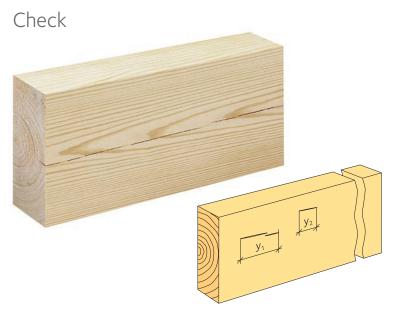
Production related features Fissures

Production related features

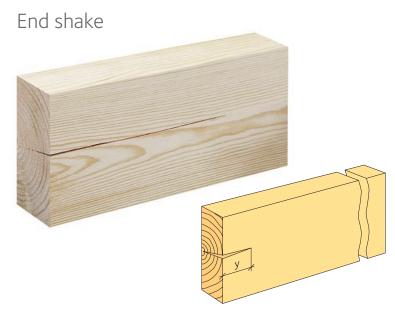


Definition	Original rounded surface of a log, with or without bark, on an arris in sawn timber. Also surface formed during ring chipping.
Requirement	Maximum total length of wane on each arris in percent of the length of the piece of timber. Maximum width of wane on face and edge respectively in mm.
Measuring rule	Total length on each arris, $y = y_1 + + y_n$. Maximum width of wane on face x_1 , Maximum width of wane on edge x_2 .

Fissures



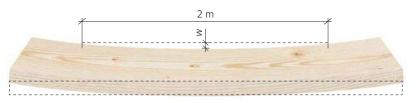
Definition	Not traversing check: Short, narrow and shallow fissure, only visible on one side of the piece of timber.
	Traversing check (Split): Fissure that extends from one side to another.
Requirement	Maximum total length of checks, <i>y</i> in percent of the length of the piece of timber.
Measuring rule	Total length of checks, $y = y_1 + + y_n$ measured parallel with the longitudinal axis of the piece of timber.



Definition	Fissure showing on the end surface of the piece of timber. Usually extending through the piece from one side to another and of limited length.
Requirement	Maximum length y in percent of the width of the piece of timber.
Measuring rule	Individual fissure length y measured parallel with the longitudinal axis of the piece of timber.

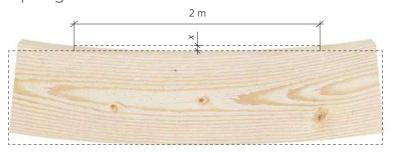
Warp

Bow



Definition	Lengthwise curvature of a piece of timber at right angles to the face.
Requirement	Maximum deviation, dimension w, in mm.
Measuring rule	Largest deviation, dimension w, over the worst 2 m length.

Spring



Definition	Lengthwise curvature of a piece of timber at right angles to the edge.
Requirement	Maximum deviation, dimension x, in mm.
Measuring rule	Largest deviation, dimension x, over the worst 2 m length.

Warp Tables

Twist



Definition	Lengthwise spiral distortion of a piece of timber.
Requirement	Maximum deviation, dimension <i>y</i> , in percent of the width of the piece of timber.
Measuring rule	Largest deviation, dimension <i>y</i> , over the worst 2 m length in relation to the outside face of the piece of timber.



Definition	Curvature of a piece of timber across the width of the face.
Requirement	Maximum deviation, dimension z, in percent of the width of the piece of timber.
Measuring rule	Largest deviation, dimension z, over the width of the piece of timber.

Tables

Grading methods

Judgement of features shall be done with regard to the grading method and the location of the feature on the piece of timber.

Grading method	Location	Judgement according to tables
G4, 4-sided grading	Faces	All features
	Edges	

G2, 2-sided grading, is seldom used in Sweden.

Determination of grade

Each side is judged separately and assigned its own class. If, when determining the grade of the piece of timber as a whole, one face is of a lower class than any of the other three sides, the grade of the piece is one grade better than this worse face.

Example:



General

The rules are applicable to all sawn timber, dried or undried. Only the lower limit for each grade is given. A lot of timber graded according to the rules shall contain a fair distribution of quality.

Table 2 – Other features Table 1 – Knots

Table 1 Knots.

	Feature			Cla	ss of the s	side	
	Maximum	2-sided grading 4)	G2-0	G2-1	G2-2	G2-3	G2-4
	permitted on worst meter	4-sided grading	G4-0	G4-1	G4-2	G4-3	G4-4
					Knot size		
б	Face		10 per	cent of the	width + [table valu	e] (mm)
adii	Sound intergrow	n knot	10	20	35	50	6)
ag l	Partially intergro	wn knot / Dead knot	0	10	20	50	
dec	Encased knot		1)	0	15	40	
2-sided grading		Unsound or loose knot		1)	15	40	
ië	"			K	not numb	er	
2 grading	Total number		2	4	6	3)	6)
sided	Of which encased, unsound and/or loose knots		0	1 ²⁾	2	5	
4		nd/or splay knots	0	4	6	3)	
	Edge		Kno	t size in pe	rcent of t	hickness 5	(%)
	Sound intergrow	n knot	50	90	100	100	6)
	Partially intergro	wn knot / Dead knot	33	67	75	100	
	Encased knot		1)	33	50	90	
	Unsound or loose	e knot	1)	1)	50	90	
		Knot number					
	Total number		1	2	4	3)	6)
	Of which encase loose knots	d, unsound and/or	0	1 ²⁾	2	3	

Maximum permitted knot size on face is 10 percent of the width + [table value] (mm).

Knots of 10 mm or less are not considered unless they are unsound or loose.

Traversing edge knots are permitted in G4-2, G4-3 and G4-4 but if unsound or loose only permitted in G4-4.

Compensation rule for face knots

If the knots are smaller than the maximum permitted knot size a larger number may be permitted but the sum of the sizes of such knots shall not exceed the maximum permitted size multiplied by the maximum permitted number of the largest knots. Only applicable for face knots.

In spruce in widths of 225 mm or wider the maximum permitted knot size on face may be increased by 10 mm. In pine in widths of 180 mm or wider the maximum permitted knot size on face may be increased by 10 mm. The total number of knots on worst meter for widths 225 mm or wider may be increased by 50 percent on both face and edge.

- 1) Not permitted.
- ²⁾ Applies to encased knots.
- 3) Unlimited.
- ⁴⁾ 2-sided grading, G2, is seldom used in Sweden.
- 5) The knot size on edge must not be larger than the corresponding maximum permitted knot size on face
- 6) Knot size and knot number unlimited but the piece of timber must hold together.

Table 2 Other features.

Feature			Cla	ss of the s	ide	
Maximum	2-sided grading 4)	G2-0	G2-1	G2-2	G2-3	G2-4
permitted	4-sided grading	G4-0	G4-1	G4-2	G4-3	G4-4
Bark pocket	•	*				
Number on worst i	meter	1)	2	2	4	3)
Total length (mm)		1)	100	200	300	3)
Resin pocket		*				
Number on worst i	meter	2	4	4	4	3)
Total length (mm)		75	100	200	300	3)
Resin wood						
Percent of the area of the side (%)		1)	10	30	50	3)
Reaction wood (C	Compression wood)					
Percent of the area of the side (%)		1)	10	30	50	3)
Strong, abnormal grain structure		1)	1)	5)	5)	5)
Soft rot		1)	1)	1)	1)	2)
Blue stain and dot	te					
Deep blue or dote, of the side (%)	percent of the area	1)	1)	10	50	3)
Surface blue, percent of the area of the side (%)		1)	1)	20	100	3)
Insect attack, dia	meter < 2 mm					
Percent of the area of the side (%)		1)	1)	1)	15	5)
Pith	,	1)	5)	5)	5)	5)

Strong, abnormal grain structure includes slope of grain, curly grain, top rupture and similar features. Active insect attack is not permitted.

Bark pockets and resin pockets are only considered on face.

No compensation rule for bark pockets and resin pockets.

When features are unlimited in G2-4 and G4-4 the piece of timber must still hold together.

For features that are limited as a percent of the area of the side and there are several affected areas those areas shall be summarized according to:

Affected area = $x_1 \cdot y_1 + ... + x_n \cdot y_n$.

The x- and y-measurements shall be taken as a rectangle enclosing the affected areas respectively.

- 1) Not permitted.
- ²⁾ Small areas permitted.
- 3) Unlimited.
- ⁴⁾ 2-sided grading, G2, is seldom used in Sweden.
- ⁵⁾ Permitted.

Grading

Table 3 – Wane, fissures, warp

Trading qualities – grades

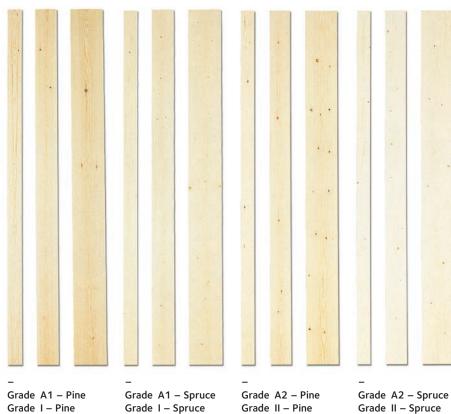
Table 3 Wane, fissures, warp.

Features	Features			Class of the side				
Manatana a a a a a da da da da da da da da da d	2-sided grading 2)	G2-0	G2-1	G2-2	G2-3	G2-4		
Maximum permitted	4-sided grading	G4-0	G4-1	G4-2	G4-3	G4-4		
Wane								
Width, on face (mm)		3	5	10	20	30		
Width, on edge (mm)		3	5	10	20	20		
Length, percent of each a	arris (%)	20	20	30	50	100		
Fissures								
End shake, percent of tim	nber width (%)	100	100	150	200	500		
Check, percent of timber	length (%) for:							
timber thicknesses < 6	10	25	35	75	100			
timber thicknesses ≥ 60 mm		10	33	50	90	100		
Split, percent of timber length (%)		1)	1)	1)	20	40		
Warp				^				
Bow, mm on 2 m for:								
timber thicknesses < 45 mm		10	10	15	50	50		
timber thicknesses ≥ 45 mm		10	10	10	20	50		
Spring, mm on 2 m		4	4	4	10	30		
Twist, percent of timber	8	8	8	10	20			
Cup, percent of timber w	idth (%)	3	3	3	5	5		

Wane with bark is not permitted. Check on edge is judged as split. Ring shake is judged as split.

Trading qualities – grades

The timber is shown in the cross-sections: 25×100 , 50×150 och 75×200 mm



European Standard EN 1611-1

According to the standard for appearance grading of softwoods, EN 1611-1, the grading can be based on both the faces and the edges or only on the faces (as regards knots). The grades are called G4 and G2 respectively. The grade name is followed by a figure which details the grade of the timber, 0-4, where 0 is the highest grade. A grade can be G4-2 which denotes 4-sided visual grading of typical building timber, corresponding to grade V according to an older grading rule. An approximate comparison with older grading rules is given in *table 4*, *page 54*. The grading method G2 is seldom used in Sweden.

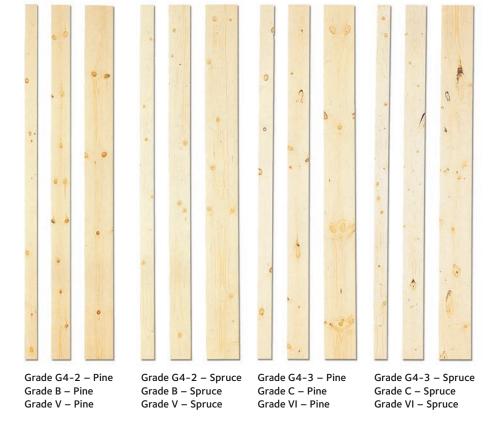
¹⁾ Not permitted.

²⁾ 2-sided grading, G2, is seldom used in Sweden.

Trading qualities – grades

Trading qualities – grades





Older grading rules for trading qualities – grades

Nordic Timber – Grading rules (The "Blue book")

According to the rules in "Nordic Timber — Grading rules" the timber is graded in three grades: A, B and C, where grade A is the highest grade, used for high-class joinery and visible boarding. Grade A can be subdivided into the grades A1-A4. Grade B is commonly used in building, while grade C is used in for example packing.

Guiding principles for grading of Swedish sawn timber (The "Green book")

According to the rules in "Guiding principles for grading of Swedish sawn timber" the timber is graded in six grades, where grade I is the highest grade. Usually the grades I—IV are not separated but sold together under the name U/S, unsorted. Grade V is usually named fifths and grade VI is named sixths.

Trading qualities – grades References

Table 4 Timber qualities. Approximate relations between the different trading qualities - grades.

Grading rules	The grades						
EN 1611-1							
4-sided grading	-	_	G4-0	G4-1	G4-2 ²⁾	G4-3	G4-4
2-sided grading 1)	-	-	G2-0	G2-1	G2-2	G2-3	G2-4

Older grading rules				;			
Nordic timber		A	A	В	С	D	
– Grading rules, 1994(The "Blue book")	A1	A1 A2 A3 A4					
Guiding principles for	U,	/S		Fifths	Sixths	Rejects	
grading of Swedish sawn timber, 1976 (The "Green book")	I	II	III	IV	V	VI	VII

^{1) 2-}sided grading, G2, is seldom used in Sweden.

References

This book is based on the content of the following standards and reports:

EN 844-1 Round and sawn timber — Terminology — Part 1: General terms common to round timber and sawn timber.

EN 844-3 Round and sawn timber — Terminology — Part 3: General terms relating to sawn timber.

EN 844-4 Round and sawn timber — Terminology — Part 4: Terms relating to moisture content.

EN 844-6 Round and sawn timber — Terminology — Part 6: Terms relating to dimensions of sawn timber.

EN 844-7 Round and sawn timber — Terminology — Part 7: Terms relating to anatomical structure of timber.

EN 844-9 Round and sawn timber — Terminology — Part 9: Terms relating to features of sawn timber.

EN 844-10 Round and sawn timber — Terminology — Part 10: Terms relating to stain and fungal attack.

EN 844-11 Round and sawn timber — Terminology — Part 11: Terms relating to degrade by insects.

EN 844-12 Round and sawn timber — Terminology — Part 12: Additional terms and general index.

EN 1313-1:2010 Round and sawn timber — Permitted deviations and preferred sizes — Part 1: Softwood sawn timber.

EN 1611-1:1999 Sawn timber — Appearance grading of softwoods — Part 1: European spruces, firs, pines and Douglas firs.

EN 1611-1:1999/A1:2002 Sawn timber — Appearance grading of softwoods — Part 1: European spruces, firs, pines, Douglas fir and larches.

Defining quality - A guide to the specification of softwood (ISBN 91-88170-31-4).

²⁾ Typical building timber.

Disclaimer

By using the content of *Grading of sawn timber in Europe according to EN 1611-1*, you accept the terms and conditions of use below. All information in *Grading of sawn timber in Europe according to EN 1611-1*, is provided solely for information purposes and must not be regarded as creating an advisory or professional relationship with the reader.

All information is provided as is and without any form of guarantee to the extent permitted by existing law. Although the publisher tries, to a reasonable extent, to provide reliable information in *Grading of sawn timber in Europe according to EN 1611-1*, the publisher does not guarantee that the content is free of errors or mistakes and/or is complete or that the content is up-to-date and relevant to the user's needs.

The publisher, Swedish Forest Industries Federation, provides no guarantee for any result of the use of the information contained in *Grading of sawn timber in Europe according to EN 1611-1*. All use of information in *Grading of sawn timber in Europe according to EN 1611-1*, is at the user's own liability and risk.

The rights to the content of *Grading of sawn timber in Europe according to EN 1611-1*, accrue to Swedish Forest Industries Federation. The content is protected under the Swedish Copyright Act. Legal action will be taken against any abuse. The content may not be copied.

Swedish Forest Industries Federation accepts no liability for any loss, damage or injury that may be caused by the content of *Grading of sawn timber in Europe according to EN 1611-1*.

Keywords

Attacks of micro-	
organisms and insects36	Knot cluster
Bark pocket28	Length
Bow45	Loose knot
Check43	Moisture conter
Compensation rule48	Moisture conter
Compression wood 31 Conifers4	Net traversia
	Not traversing arris knot
Curly arain 33	di i i S Ki i Ot
Curly grain33	Outside face
Deep blue stain39	Oval knot
Determination of grade 47	Oven dry metho
Dimension8	Overrury metric
Dote37	Partially intergro
Dote 37	Dead knot
Edge13	Permitted devia
Encased knot15	Picea abies
End shake44	Pin knot
	Pine
Face12	Pinus sylvestris.
Face width9	Pith
Fissures43	Pith catcher
Four piece cut5	
	Reaction wood.
Grading methods47	References
	Resin pocket
Insect attack 40	Resin wood

Inside

face12	Round knot18
luster26	Sawing patterns5
4.0	Size8
110	Slope of grain32
knot16	Soft rot38
	Sound, intergrown knot 15
ure content11	Species4
ure content meter 11	Spike knot23
	Splay knot24
aversing	Spring45
not21	Spruce4
	Strong, abnormal grain
le face12	structure27
not19	Surface blue stain39
dry method11	
	Thickness8
ly intergrown knot/	Through cut7
knot15	Top rupture34
tted deviations 10	Trading qualities51
abies4	Traversing arris knot 22
ot25	Traversing edge knot 20
4	Twist46
sylvestris4	
35	Unsound knot16
atcher6	
	Wane42
on wood31	Warp45
ences55	Width9
oocket29	

Notes

Grading of sawn timber in Europe according to EN 1611-1

© Swedish Forest Industries Federation, 2016 First edition

Publisher

Swedish Forest

Industries Federation

Swedish Wood P O Box 55525

SE-102 04 Stockholm

Sweden

Tel: +46 8 762 72 60 Fax: +46 8 762 79 90

 $\hbox{E-mail: in fo@swed is hwood.com}\\$

www.swedishwood.com

Project manager

Johan Fröbel – Svenskt Trä

Editor

Johan Fröbel – Svenskt Trä

Author

Jan Brundin

Johan Fröbel – Svenskt Trä

Contributor

Marie Åsell – Svenskt Trä

Illustrations

ProService Kommunikation AB Visualisera arkitektur AB

Photos

ProService Kommunikation AB

Design and production

ProService Kommunikation AB

ISBN 978-91-981922-9-2

58 Handelssortering 59



For more information about wood: www.swedishwood.com

SWEDISH WOOD™

P O Box 55525 SE-102 04 Stockholm Sweden

Tel: +46 8 762 72 60 Fax: +46 8 762 79 90 info@swedishwood.com swedishwood.com

Swedish Wood spreads knowledge, provides inspiration and encourages development relating to wood, wood products and wood construction.

The goal is to increase the use of wood in Sweden and in selected international markets through information and inspiration. Swedish Wood also aims to highlight wood as a competitive, eco-friendly and sustainable material.

Swedish Wood is a department within The Swedish Forest Industries Federation Swedish Wood is supported by the Swedish sawmill and glulam industries.



ISBN 978-91-981922-9-2