BRITISH STANDARD

BS EN
1310 : 1997

Round and sawn timber — Method of measurement of features

The European Standard EN 1310 : 1997 has the status of a British Standard

ICS 79.040

National foreword

This British Standard is the English language version of EN 1310 : 1997.

The UK participation in its preparation was entrusted by Technical Committee B/543, Round and sawn timber, to Subcommittee B/543/1, Timber terminology and measurement, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled 'International Standards Correspondence Index', or by using the 'Find' facility of the BSI Standards Electronic Catalogue.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

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ICS 79.040

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English version

Round and sawn timber — Method of measurement of features

Bois ronds et bois sciés — Méthode de mesure des singularités

Rund- und Schnittholz — Messung der Merkmale

This European Standard was approved by CEN on 1997-03-05. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 175, Round and sawn timber, the Secretariat of which is held by AFNOR.

This standard is one of a series, being methods of measurement for round timber and sawn timber.

Other standards in this series are:

EN 1309-1	*Round and sawn timber — Method of measurement of dimensions — Part 1: Sawn timber*
prEN 1309-2	*Round and sawn timber — Method of measurement of dimensions — Part 2: Round timber*
EN 1311	*Round and sawn timber — Method of measurement of biological degrade*

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 1997, and conflicting national standards shall be withdrawn at the latest by October 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This standard specifies the methods of measuring features taken into account in the visual grading of sawn, processed and round timber for appearance or to assess its mechanical properties. It does not apply to the strength grading of structural timber (see EN 518 and EN 519).

This standard applies to hardwood and softwood sawn timber, both square edged and unedged, to processed timber and to round timber. This standard does not apply to tropical timber.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN 844-1	*Round and sawn timber — Terminology — Part 1: General terms common to round timber and sawn timber*
EN 844-2	*Round and sawn timber — Terminology — Part 2: General terms relating to round 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 844-5	*Round and sawn timber — Terminology — Part 5: Terms relating to dimensions of round timber*
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 844-8	*Round and sawn timber — Terminology — Part 8: Terms relating to features of round timber*
EN 844-9	*Round and sawn timber — Terminology — Part 9: Terms relating to features of sawn timber*
prEN 844-10	*Round and sawn timber — Terminology — Part 10: Terms relating to stain and fungal attack*
prEN 844-11	*Round and sawn timber — Terminology — Part 11: Terms relating to degrade by insects*
EN 518	*Structural timber — Grading — Requirements for visual strength grading standards*
EN 519	*Structural timber — Grading — Requirements for machine strength graded timber and grading machines*

3 Definitions

For the purposes of this standard, the definitions in the standards listed in clause **2** apply.

4 Sawn and processed timber

4.1 Knots

For the purposes of this standard, knots in sawn timber are classified according to their shape, size and position. Size is derived from the formulae given below and expressed in millimetres or as a percentage of a dimension of the surface where the knot occurs. The following symbols are used in the formulae, with suffixes as required:

- d is the size, in millimetres;
- a is the width on the minor axis, in millimetres;
- b is the width on the major axis, in millimetres.

Two methods for measuring knots are given: 'general method' for appearance grading and 'alternative method' where the strength of the piece is to be assessed. If strength grading is required, reference shall be made to EN 518 for visual grading and EN 519 for machine grading. When the standard is applied, it shall be stated whether the 'general' or the 'alternative' method is used.

4.1.1 *General method*

Consider each knot individually.

Measure knots on a part or all the surface of the face(s) or the edge(s) as specified by the grading rule used.

Figures 1 to 6 show the categories of knots that shall be measured. Each figure is accompanied by the corresponding formula that is generally the arithmetic average of the width on the minor (a) and major (b) axis of the knot [$d = (a + b)/2$]. Then measure the width on the minor and the major axes and derive the size from the formula.

NOTE. The maximum size of each kind of knot and the maximum number of these largest knots per piece or per unit length is stated in the grading standards. For knots that are smaller, a larger number may be permitted, but the sum of the sizes of such knots should not exceed the maximum permitted size multiplied by the maximum permitted number of the largest knots. See formula below.

$$d_1 + d_2 + \ldots + d_n \leq n_{max} \times d_{max}$$

where

n_{max}	is the maximum permitted number of knots;
$d_1, d_2, \ldots d_n$	are the sizes of the individual knots, in millimetres;
d_{max}	is the maximum permitted size of a knot, in millimetres.

If a grading standard permits the use of the method given in the above note this shall be stated in the grading standard.

4.1.1.1 *Round knot*

Formula: $d = \frac{a + b}{2}$

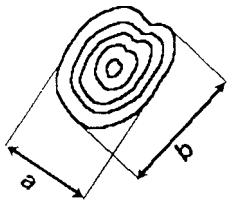


Figure 1. Round knot

4.1.1.2 *Oval knot*

Formula: $d = \frac{a + b}{2}$

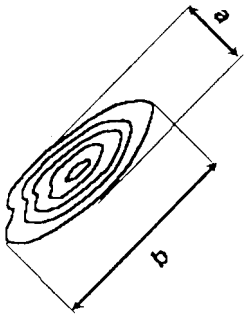


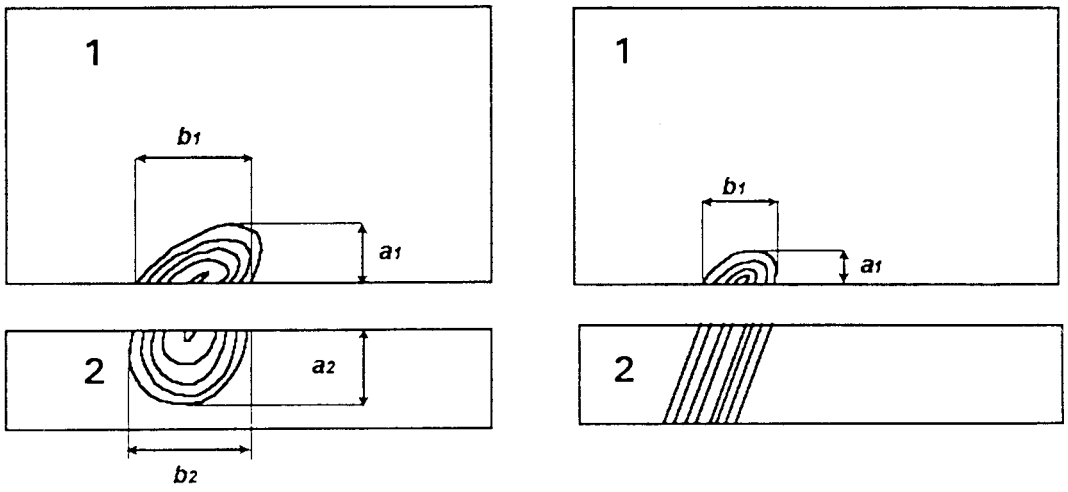
Figure 2. Oval knot

4.1.1.3 *Arris knot*

Formulae:

on face (knot A and knot B): $d = \frac{a_1 + b_1}{2}$

on edge (knot A): $d = \frac{a_2 + b_2}{2}$



KNOT A KNOT B

1 - On faces; 2 - On edges (knot B: not measured, record its presence)

Figure 3. Arris knot

4.1.1.4 *Spike knot*

Depending on the grading rule used,

a) use the formula: $d = \frac{a + b}{2}$; or

b) not measured, record its presence.

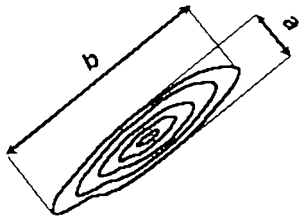


Figure 4. Spike knot

4.1.1.5 *Splay knot*

Depending on the grading rule used,

a) measure on the edge only and use the formula: $d = \frac{a + b}{2}$; or

b) not measured, record its presence.

4.1.1.6 *Branched knot*

Depending on the grading rule used,

a) not measured, record its presence; or

b) record the number of knots in a unit of length.

4.1.1.7 *Knot cluster*

Measure the individual knots.

4.1.1.8 *Cat's paw*

Measure the total size of the knot cluster.

Formula: $d = \frac{a + b}{2}$

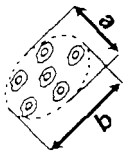


Figure 6. Cats' paw

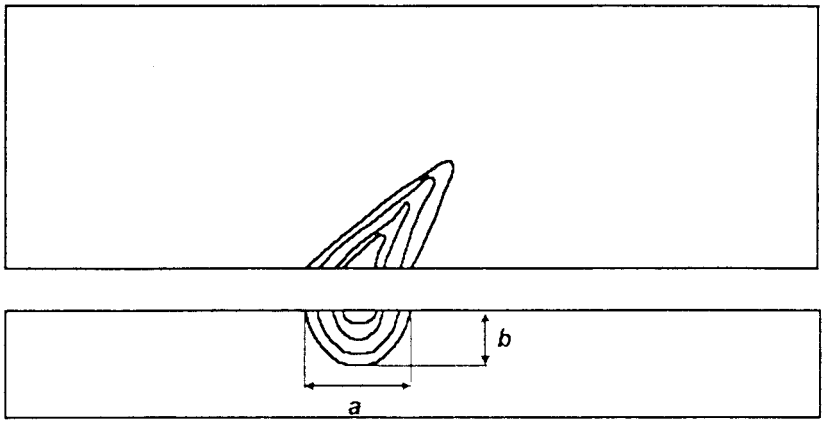


Figure 5. Splay knot

4.1.2 ***Alternative method***

This method is not used for unedged timber.

Consider knots only on a face and/or an edge where they appear cut transversely or obliquely.

Figures 7 to 12 show the categories of knots that shall be measured. The size shall be the width of the knot or knot cluster, measured at right angles to the longitudinal axis of the piece.

4.1.2.1 *Round knot*

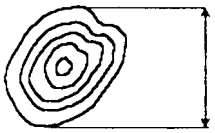
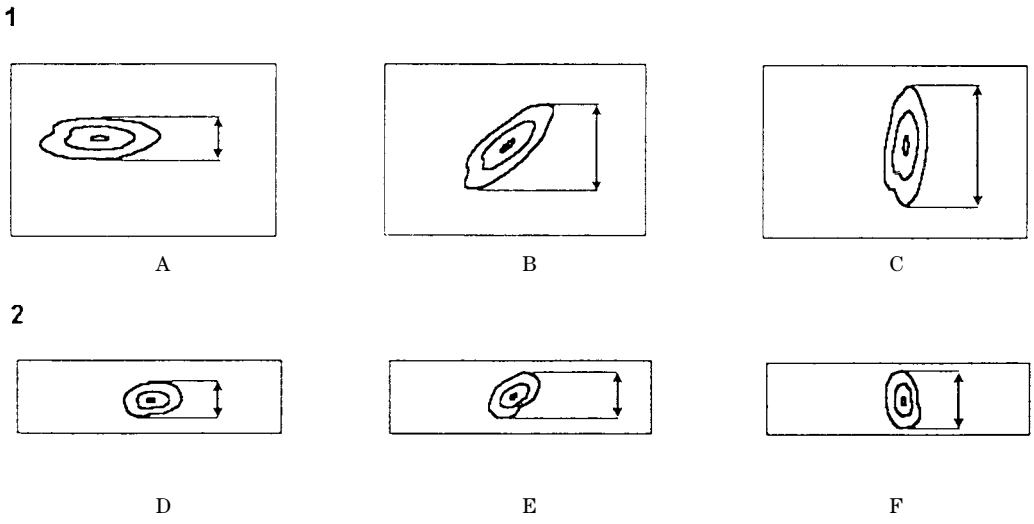


Figure 7. Round knot

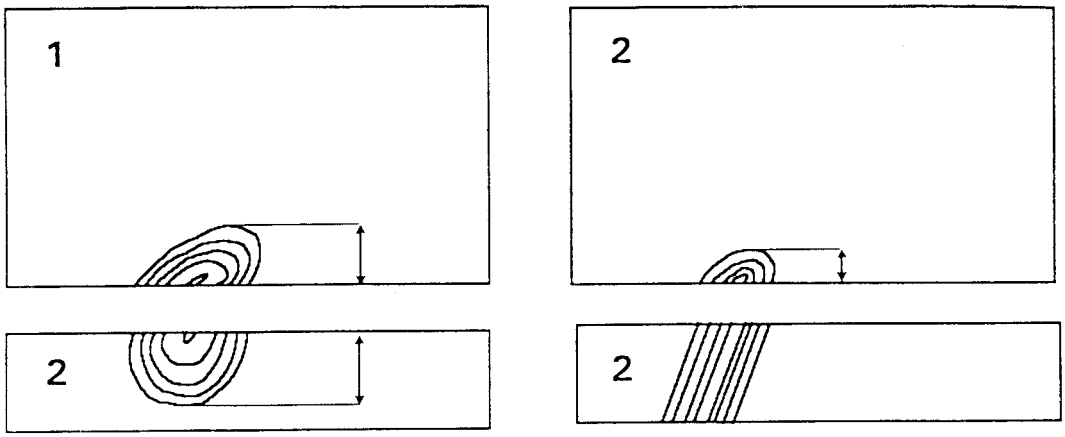
4.1.2.2 *Oval knot*



1 - On faces; 2 - On edges

Figure 8. Oval knot

4.1.2.3 *Arris knot*



KNOT A KNOT B

1 - On faces; 2 - On edges (knot B: not measured, record its presence)

Figure 9. Arris knot

4.1.2.4 *Spike knot*

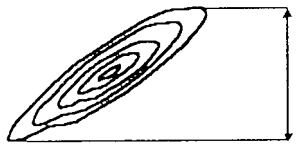


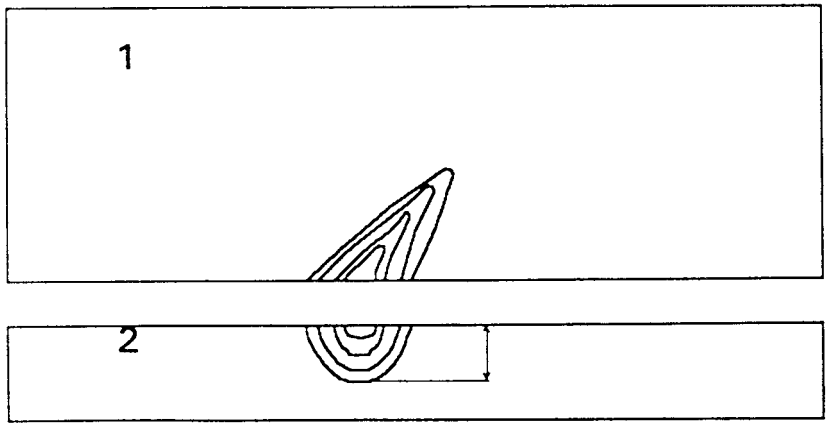
Figure 10. Spike knot

4.1.2.5 *Splay knot*

Measure on the edge where it has been transversely cut.

4.1.2.6 *Branched knot*

Measure on the edge, see **4.1.2.5** and figure 11.



1 - On faces; 2 - On edges

Figure 11. Splay knot

4.1.2.7 *Knot cluster*

Knots are measured on the surface on which they are transversely cut.

The size d shall be the overall width of the knot cluster (figure 12A: measure d), or the sum of the sizes of the individual knots (figure 12B), where

$$d = d_1 + d_2 + \ldots + d_n$$

whichever is less.

4.2 Resin pocket

Depending on the grading rule used,

a) measure the major axis of the resin pocket, expressed in millimetres. If more than one, also record their number per metre length of the piece or for the full length of the piece; or

b) not measured, record its presence.

4.3 Reaction wood

Depending on the grading rule used,

a) measure the length and/or the width of a rectangle that encloses it, expressed in centimetres or as a percentage of the length and/or the width of the surface (face or edge) being considered. Where there are two or more areas of reaction wood, each shall be measured as before, and the respective dimensions totalled; or

b) not measured, record its presence.

4.4 Grain

4.4.1 *Slope of grain*

Use a scribe to determine slope of grain.

A scribe is shown in figure 13.1. It consists of a cranked rod with a swivel handle at one end, a needle set to a slight trailing angle at the other.

If the scribe is drawn along the piece of timber in the apparent direction of the grain, applying sufficient but not excessive pressure, it will scribe a line that shows accurately the direction of grain.

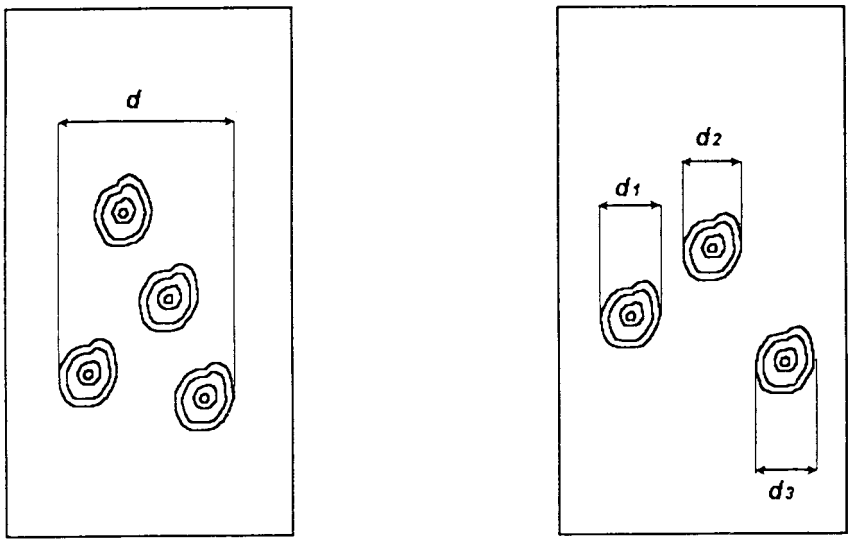
To check, it is recommended to draw several adjacent lines, with the direction of pull diverging slightly to the left and to the right; the scribe should still follow the correct direction (see figure 13.2). Express the result as a percentage, using the formula:

$$\frac{x}{y} \times 100$$

where

x is the deviation of the grain, in millimetres;

y is the length over which the measurement is taken, in millimetres.



A B

Figure 12. Knot cluster

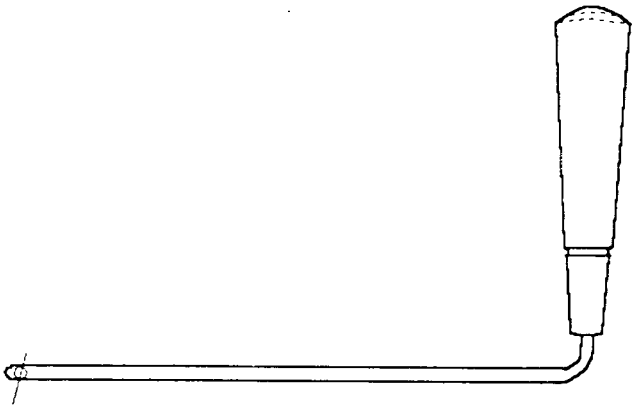


Figure 13.1 Scribe

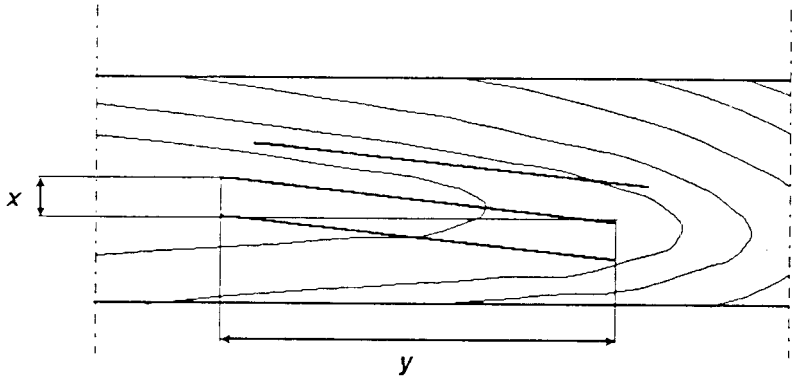


Figure 13.2 Use of a scribe

4.4.2 ***Spiral, interlocked grain***

Not measured, record its presence.

4.4.3 ***Curly grain***

Depending on the grading rule used,

a) measure the length and/or the width of a rectangle that encloses it, expressed in centimetres or as a percentage of the length and/or the width of the surface (face or edge) being considered. Where there are two or more areas of curly grain, each shall be measured as before, and the respective dimensions totalled; or

b) not measured, record its presence.

4.5 Rate of growth

On one end of the piece, mark out the longest possible straight line normal to the growth rings. Count the number of growth rings along this line. Repeat at the other end of the piece. Disregard the portion, if any, within 25 mm of the pith. Divide the sum of the lengths of the two lines at the two ends by the total number of growth rings counted to obtain the rate of growth, expressed as the average width of the growth rings in millimetres (see figure 14).

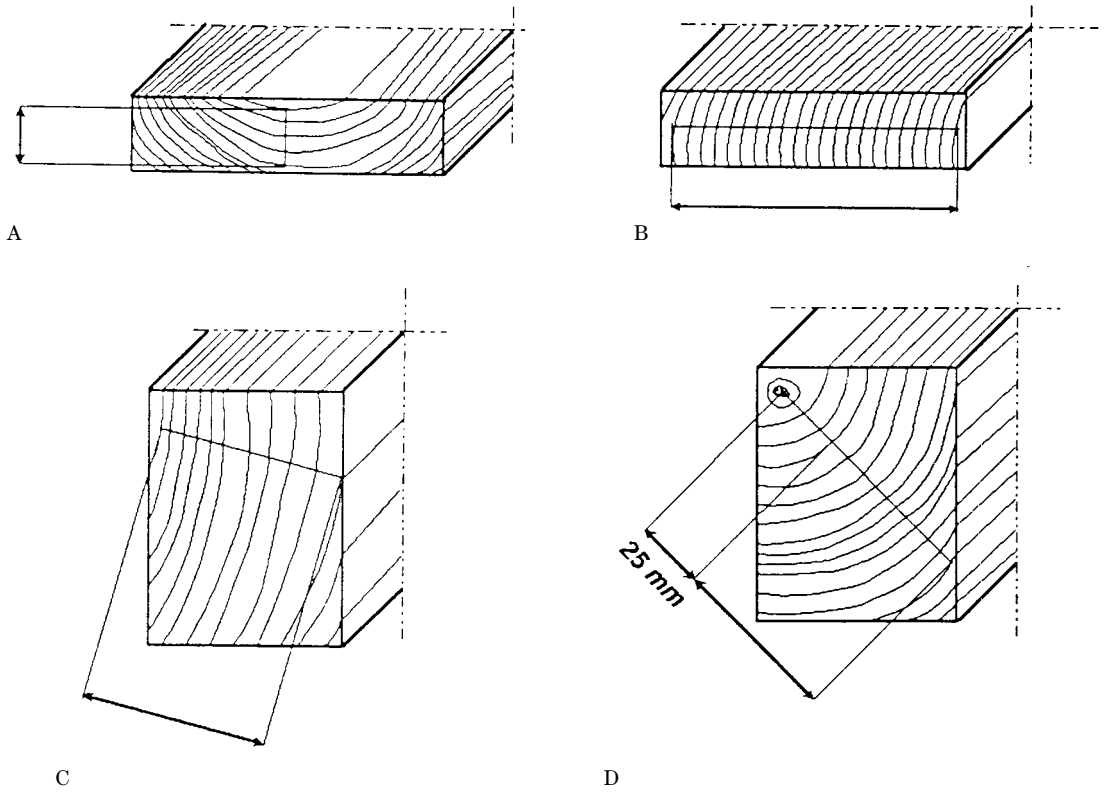


Figure 14. Rate of growth

4.6 Bark pocket

Depending on the grading rule used,

a) measure the length and/or the width of a rectangle that encloses it, expressed in centimetres or as a percentage of the length and/or the width of the surface (face or edge) being considered. Where there are two or more areas of bark pocket, each shall be measured as before, and the respective dimensions totalled; or

b) record the number of bark pockets over one metre length or over the length of the piece; or

c) not measured, record its presence.

4.7 Sapwood

Depending on the grading rule used,

a) find that portion of the surface (face or edge) being considered where the sapwood is widest. Measure the width and express the result in millimetres or as a percentage of the width of the surface; or

b) not measured, record its presence.

4.8 Wane

Depending on the grading rule used,

a) measure the length (c) of wane and express it in centimetres or as a percentage of the length. If wane shows on more than one part of the arris, add the different lengths (c_1, c_2, … c_n), see figure 15; or

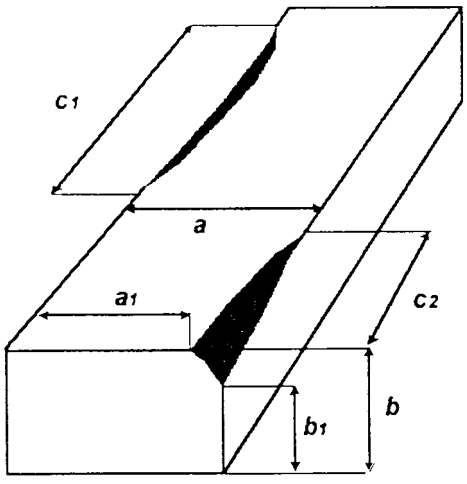


Figure 15. Wane

b) measure the greatest width of the wane on the face or edge and express the result in millimetres, or alternatively, as a decimal fraction using the following formulae:

$$w_f = \frac{a - a_1}{a}$$

$$w_e = \frac{b - b_1}{b}$$

where

w_f is the width of the wane on the face, as a decimal fraction;

w_e is the width of the wane on the edge, as a decimal fraction;

a is the full width of the face, in millimetres;

a_1 is the width of the face when reduced by the wane, in millimetres;

b is the full width of the edge, in millimetres;

b_1 is the width of the edge when reduced by the wane, in millimetres, see figure 15; or

c) not measured, record its presence.

4.9 Fissure

4.9.1 ***Face, edge and end shakes, splits***

Depending on the grading rule used,

a) measure its length by determining the distance between two lines normal to the longitudinal axis of the piece and passing through the ends of the fissure. For a cluster of fissures, measure the overall length of the cluster. If there are several fissures or clusters, total their length. Express the result in millimetres or as a percentage of the length of the piece; or

b) not measured, record their presence.

4.9.2 ***Ring and heart shakes***

If showing only at one or both ends of the piece, record their presence.

If showing on a face or edge, measure as in **4.9.1**.

4.9.3 ***Checks***

Depending on the grading rule used,

a) measure the length and/or the width of the rectangle that encloses the portion where they occur, expressed in millimetres or as a percentage of the length and/or width of the surface (face or edge) being considered; or

b) record their presence.

4.10 Warp

4.10.1 ***Bow and spring***

Measure the maximum distortion from the straight:

a) for pieces up to a length of 2 m, applying a straight edge, expressing the result in millimetres;

b) for pieces longer than 2 m, over a 2 m length, using a 2 m long rigid straight edge applied against the piece symmetrically at the point of maximum distortion, visually estimated. Express the result in millimetres per 2 m (see dimension w in figure 16 and dimension x in figure 17).

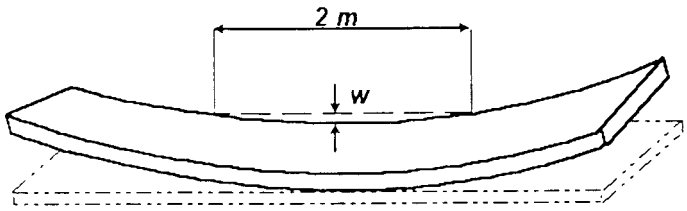


Figure 16. Bow

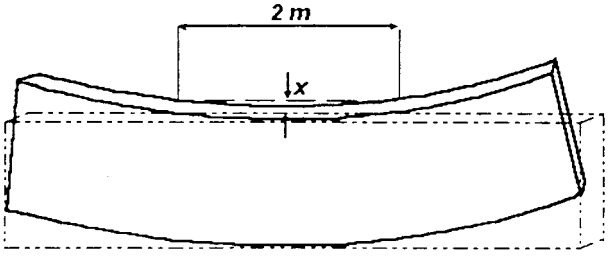


Figure 17. Spring

4.10.2 *Cup*

Measure the maximum distortion in the width of the piece, expressed in millimetres or as a percentage of the width. See dimension z in figure 18.

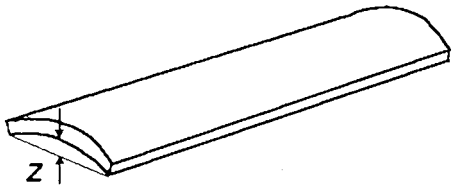


Figure 18. Cup

4.10.3 *Twist*

Measure the maximum distortion of the surface over a representative 2 m length, expressed in millimetres or as a percentage of the length of the piece. See dimension y in figure 19.

5 Round timber

5.1 Knots

5.1.1 *Uncovered knot*

Measure, close to the curved surface of round timber, the smaller diameter of the knot. Express the result in millimetres. Disregard the surrounding callus.

5.1.2 *Covered knot*

Not measured, record its presence.

5.1.3 *Rose*

Depending on the grading rule used,

a) measure the smaller diameter of the outer complete concentric ring, expressed in millimetres; or

b) not measured, record its presence.

5.1.4 *Epicormic shoot*

Not measured, record its presence.

5.1.5 *Burl*

Not measured, record its presence.

5.1.6 *Chinese moustache*

Depending on the grading rule used,

a) measure the height of the arc drawn on the surface, expressed in millimetres; or

b) not measured, record its presence.

5.2 Fissures

5.2.1 *Heart shake*

Depending on the grading rule used,

a) measure the length of the fissure visible on one end surface of round timber starting from the pith, expressed in millimetres; or

b) not measured, record its presence.

5.2.2 *Star shake*

Depending on the grading rule used,

a) measure the length of the longest fissure visible on the end surface of round timber starting from the pith, expressed in millimetres; or

b) not measured, record its presence.

5.2.3 *Ring shake*

Depending on the grading rule used,

a) measure the diameter of the circle of which the ring shake is an arc, expressed in millimetres or as a percentage of the diameter of round timber; or

b) not measured, record its presence.

5.2.4 *Frost crack, lightning shake*

Depending on the grading rule used,

a) measure its length, expressed in centimetres or as a percentage of the length of round timber. If more than one, total their lengths; or

b) not measured, record its presence.

5.2.5 *Check, traversing crack*

Not measured, record its presence.

5.2.6 *Felling shake*

Measure its length, expressed in centimetres or as a percentage of the length of round timber.

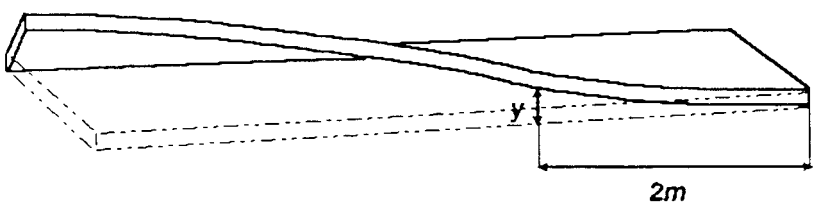


Figure 19. Twist

5.3 Sweeps

5.3.1 *Simple sweep*

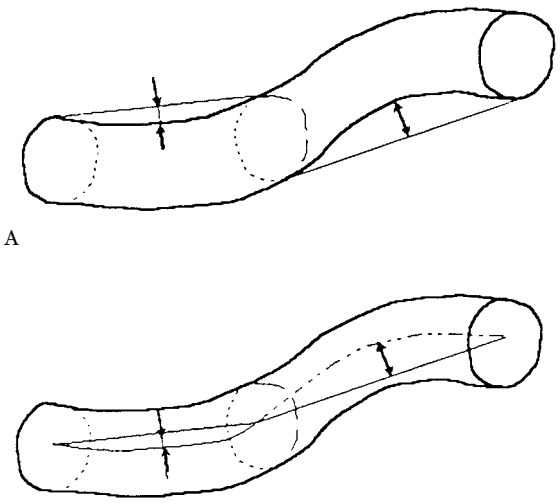
If conditions permit, measure the maximum distance between the assessed concave centre line of the log and a straight line joining the centres of each end, expressed in centimetres per metre length of the log (see figure 20A).

If the above method is not possible, measure the maximum distance between the rounded concave surface and a straight line joining the innermost points of the end surfaces (see figure 20B).

5.3.2 *Multiple sweep*

Divide the log with theoretical crosscut points into straight or simple sweep portions. Measure each portion as specified in **5.3.1** above (see figures 21A and 21B).

Record each value separately in centimetres per metre length of the portion.

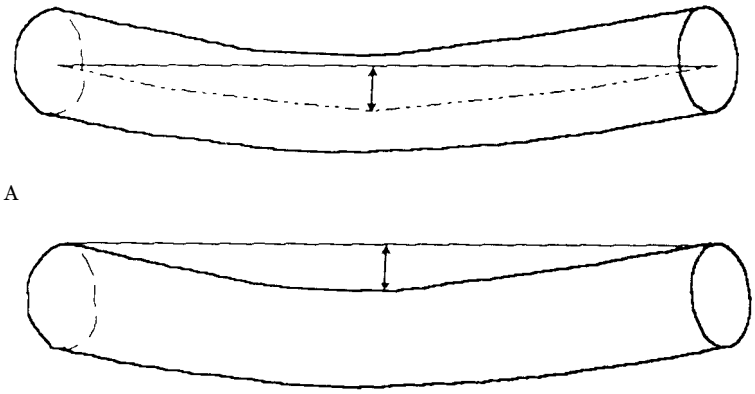


A

B

A) Centre line measure B) Surface measure

Figure 21. Multiple sweep



A

B

Figure 20. Simple sweep

A) Centre line measure B) Surface measure

5.4 Ovality

At a point at least 1 m from the larger end, measure the largest and the smallest diameter. Express the result as the difference between the two diameters either in centimetres, or as a percentage of the largest diameter.

5.5 Taper

Measure the diameter at each end, at least 5 cm from the ends (in the case of a butt log, 1 m from the larger end).

Express the result as a difference between the two diameters in centimetres per metre distance between the measuring points.

NOTE. If an obvious reduction or increase of the diameter exists at the place(s) specified for measurement, measure at 5 cm from this place on the regular part of the round timber.

5.6 Spiral grain

Select a 1 m long portion of the curved surface that shows the largest slope of grain. In the case of a butt log, select a portion at least 1 m from the larger end. Measure the amount by which the grain deviates from a line parallel to the axis of the log over a distance of 1 m. Express the result, shown in figure 22 as a, in centimetres per metre or as a percentage.

5.7 Compression wood

Not measured, record its presence.

NOTE. Tension wood is not clearly visible on round timber.

5.8 Rate of growth

Measure the length of the outer 75 % of a representative radius of an end surface of the round timber. Count the number of growth rings along this length. Divide the length by the number of growth rings. Express the result in millimetres.

5.9 Double pith

Not measured, record its presence.

5.10 Sapwood

On one of the end faces measure the width of sapwood in a radial direction at the point where it appears to be the widest. Express the result in millimetres or as a percentage of the diameter of the end face being considered. In the case of a butt log, measure at the smaller end.

5.11 Included sapwood

Not measured, record its presence.

5.12 Eccentric pith

On one of the end faces, measure the distance between the pith and the geometric centre of the cross-section, expressed in centimetres or as a percentage of the diameter of the cross-section.

5.13 False heartwood

Measure the diameter of a circle that encloses the area affected, expressed as a percentage of the diameter of the end face considered.

5.14 Dry side

Depending on the grading rule used,

a) measure the length of the portion where it occurs, expressed in metres to two decimal places, or as a percentage of the length of round timber or estimated height of the tree; or

b) not measured, record its presence.

NOTE. For round timber, it is recommended to record the distance between the larger end and the affected area. For trees, it is recommended to estimate visually the height above ground. Either to be expressed in metres to two decimal places.

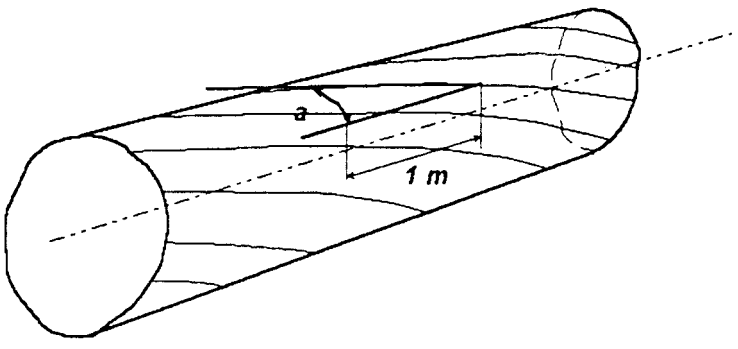


Figure 22. Spiral grain

5.15 Parasitic plant

Depending on the grading rule used,

a) measure the length of the portion where it occurs, expressed in metres to two decimal places, or as a percentage of the length of round timber or estimated height of the tree; or

b) not measured, record its presence.

NOTE. For round timber, it is recommended to record the distance between the larger end and the affected area. For trees, it is recommended to estimate visually the height above ground. Either to be expressed in metres to two decimal places.

5.16 Carbonized wood

Depending on the grading rule used,

a) measure the length of the portion where it occurs, expressed in metres to two decimal places, or as a percentage of the length of round timber or estimated height of the tree; or

b) not measured, record its presence.

NOTE. For round timber, it is recommended to record the distance between the larger end and the affected area. For trees, it is recommended to estimate visually the height above ground. Either to be expressed in metres to two decimal places.

5.17 Cancer

Depending on the grading rule used,

a) measure the length of the portion where it occurs, expressed in metres to two decimal places, or as a percentage of the length of round timber or estimated height of the tree; or

b) not measured, record its presence.

NOTE. For round timber, it is recommended to record the distance between the larger end and the affected area. For trees, it is recommended to estimate visually the height above ground. Either to be expressed in metres to two decimal places

5.18 Bird peck

Not measured, record its presence.

5.19 Other damage

Depending on the grading rule used,

a) measure the length of the portion where it occurs, expressed in metres to two decimal places, or as a percentage of the length of round timber or estimated height of the tree; or

b) not measured, record its presence.

NOTE. For round timber, it is recommended to record the distance between the larger end and the affected area. For trees, it is recommended to estimate visually the height above ground. Either to be expressed in metres to two decimal places.

5.20 Tapping cut

Depending on the grading rule used,

a) measure the length of the portion where it occurs, expressed in metres to two decimal places, or as a percentage of the length of round timber or estimated height of the tree; or

b) not measured, record its presence.

NOTE. For round timber, it is recommended to record the distance between the larger end and the affected area. For trees, it is recommended to estimate visually the height above ground. Either to be expressed in metres to two decimal places.

5.21 Foreign bodies

Not measured, record its presence.

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