

Grading of oak logs based on German grading rules for roundwood (RVR), July 2020 and European Standard EN 1316-1:2013

The classification applies for the following species: *Quercus robur*, *Quercus petraea*, *Quercus frainetto*, *Quercus pubescens*.

Feature	F1	F2	A	B	C
Min diameter cm	40	40	30	25	25
Min length cm	200	200	200	200	200
Sound knots	1 / 1m (≤ 2 cm)	2 / 1m (≤ 2 cm)	1 / 3m (≤ 2 cm)	1 / 1m (≤ 4 cm); 1 / 3m (≥ 4 cm)	allowed
Unsound knots	not allowed	not allowed	not allowed	1 / 4m (≤ 4 cm); not allowed (≥ 4 cm)	allowed in normal quantity (≤ 4 cm); 2 / 4m (≥ 4 cm)
Overgrown knots	not allowed	not allowed	1 / 1m (≤ 3 cm)	unlimited (≤ 3 cm); 1 / 1m (≥ 3 cm)	unlimited (≤ 3 cm); 1 / 1m (≥ 3 cm)
Water sprouts	not allowed	1 / 2m	1 / 2m	allowed	allowed
Burls	not allowed	not allowed	not allowed	1 / 2m	allowed
Spiral grain	not allowed	≤ 4 cm/m	≤ 4 cm/m	≤ 7 cm/m	allowed
Eccentric pith	not allowed	$\leq 10\%$	$\leq 10\%$	$\leq 20\%$	unlimited
Max sweep % L	2	3	3	4	5
Max ovality % d_s	20	unlimited	unlimited	unlimited	unlimited
Max fluted log % d_s	not allowed	not allowed	5	10	10
Max taper % D	3	5	4	6	10
Star crack	not allowed	not allowed	not allowed	2/3 radius	allowed
Ring crack	not allowed	not allowed	not allowed	1/3 radius on strong end	2/3 radius on strong end
Front crack	10cm	10cm	d_s	d_s	2 d_s
Frost crack	not allowed	not allowed	not allowed	not allowed	1 straight frost crack allowed
Moon ring	not allowed	not allowed	not allowed	not allowed	not allowed
Insect holes	not allowed	not allowed	not allowed	allowed limited number in sapwood	allowed in sapwood

Feature	F1	F2	A	B	C
Rot	not allowed	not allowed	not allowed	1/5 radius	1/3 radius
Rate of growth	max 4mm, uniformly spaced rings	max 4mm, uniformly spaced rings	no requirements	no requirements	no requirements
Color	uniform color	variations allowed	homogeneous	no requirements	no requirements
Wood felling damages	not allowed	not allowed	allowed, if fresh	allowed, if open	allowed, if close and one-sided
Dead tree	not allowed	not allowed	not allowed	bark mostly firm and sapwood mostly sound	bark mostly detached and sapwood mostly sick
Number of defects	4	6	6	6	6

Saw Logs	Description
A	First quality timber: generally corresponding to a butt log with clear timber or with only minor features which do not restrict use.
B	Timber of average to first quality, with no specific requirements for clear wood. Knots are permitted to such an extent as is considered to be average for each species.
C	Timber of average to low quality, allowing all quality features which do not seriously reduce the natural features of the wood.
D	Timber which can be sawn into usable wood, which, because of its features, falls into none of the quality classes A, B or C.

Veneer (grades F1 and F2) is sound, straight-edged, solid wood, knotless or almost knotless as well as rose-free or almost rose-free. Tree ring construction and color should meet additional specific requirements. Minor defects are allowed in the center of the log. Minimum diameter 35cm, minimum length 2.00 m; mild wood structure, uniform, narrow growth rings.

In the case of one feature exceeding the limit of the class, which would lead to a downgrading, the reduction of length or diameter excluding the feature may allow to remain in this class.

Measurement: When measuring the length of logs, the excess length amounts to 1% of the total length, but at least 10 cm.

The central diameter (d) is to be measured in the middle of the log, without taking into account the excess length.

The central diameter is measured by two mutually perpendicular measurements, preferably the smallest and the largest diameter.

The diameter is rounded down to the whole centimeter.

When measuring the central diameter, a standardized bark deduction is taken into account, based on the species as follows: Quercus obur = 3cm; Quercus petraea / Quercus frainetto / Quercus pubescens = 2cm

Grading of ash logs based on European Standard EN 1316-3:1998

The classification applies for the following species: *Fraxinus angustifolia*, *Fraxinus excelsior*.

Feature	F1	F2	A	B	C
Min diameter	40	40	30	25	25
Min length cm	200	200	200	200	200
Sound knots	not allowed	not allowed	not allowed	$\sum \max \leq 150\text{mm} / 3\text{m}$ and $\phi < 60\text{mm}$	$\sum \max \leq 150\text{mm} / 2\text{m}$
Unsound knots	not allowed	not allowed	not allowed	not allowed	$\sum \max \leq 80\text{mm} / 2\text{m}$
Overgrown knots	not allowed	not allowed	not allowed	not allowed	1 / 2m
Water sprouts	not allowed	1 / 2m	1 / 2m	allowed	allowed
Burls	not allowed	not allowed	not allowed	1 / 2m	allowed
Spiral grain	not allowed	$\leq 4\text{cm/m}$	$\leq 4\text{cm/m}$	$\leq 7\text{cm/m}$	allowed
Eccentric pith	not allowed	$\leq 10\%$	$\leq 10\%$	$\leq 20\%$	unlimited
Max sweep % L	2	3	3	4	allowed
Max ovality % d_s	20	unlimited	unlimited	unlimited	unlimited
Max fluted log % d_s	not allowed	not allowed	5	10	10
Max taper % D	3	5	4	6	10
Simple heart crack	not allowed	allowed in central 1/3 of diameter	allowed in central 1/3 of diameter	allowed in central 1/2 of diameter	allowed
Star crack	not allowed	not allowed	not allowed	1/5 diameter	1/3 diameter
Ring crack	not allowed	not allowed	not allowed	1/3 radius on strong end	2/3 radius on strong end
Front crack	10cm	10cm	d_s	d_s	$2d_s$
Frost crack	not allowed	not allowed	not allowed	not allowed	1 straight frost crack allowed
Insect holes	not allowed	not allowed	not allowed	not allowed	not allowed
Rot	not allowed	not allowed	not allowed	not allowed	1/5 radius
Rate of growth	max 4mm, uniformly spaced rings	max 4mm, uniformly spaced rings	no requirements	no requirements	no requirements
Color	uniform color	variations allowed	homogeneous	no requirements	no requirements
Brown heart	$\leq 20\%$ of diameter	$\leq 20\%$ of diameter	$\leq 20\%$ of diameter	$\leq 30\%$ of diameter	allowed

Feature	F1	F2	A	B	C
Wood felling damages	not allowed	not allowed	allowed, if fresh	allowed, if open	allowed, if close and one-sided
Dead tree	not allowed	not allowed	not allowed	bark mostly firm and sapwood mostly sound	bark mostly detached and sapwood mostly sick
Canker	not allowed	not allowed	not allowed	not allowed	allowed
Number of defects	4	6	6	6	6

Saw Logs	Description
A	First quality timber: generally corresponding to a butt log with clear timber or with only minor features which do not restrict use.
B	Timber of average to first quality, with no specific requirements for clear wood. Knots are permitted to such an extent as is considered to be average for each species.
C	Timber of average to low quality, allowing all quality features which do not seriously reduce the natural features of the wood.
D	Timber which can be sawn into usable wood, which, because of its features, falls into none of the quality classes A, B or C.

Veneer (grades F1 and F2) is sound, straight-edged, solid wood, knotless or almost knotless as well as rose-free or almost rose-free. Tree ring construction and color should meet additional specific requirements. Minor defects are allowed in the center of the log. Minimum diameter 35cm, minimum length 2.00 m; mild wood structure, uniform, narrow growth rings.

In the case of one feature exceeding the limit of the class, which would lead to a downgrading, the reduction of length or diameter excluding the feature may allow to remain in this class.

Measurement: When measuring the length of logs, the excess length amounts to 1% of the total length, but at least 10 cm.

The central diameter (d) is to be measured in the middle of the log, without taking into account the excess length.

The central diameter is measured by two mutually perpendicular measurements, preferably the smallest and the largest diameter.

The diameter is rounded down to the whole centimeter.

When measuring the central diameter, a standardized bark deduction is taken into account, based on the species as follows: *Fraxinus angustifolia* = 2cm

Grading of beech logs based on German grading rules for roundwood (RVR), July 2020 and European Standard EN 1316-1:2013

The classification applies for the following species: *Fagus sylvatica*.

Feature	F1	F2	A	B	C
Min diameter	40	40	30	25	25
Min length cm	200	200	200	200	200
Sound knots	not allowed	not allowed	not allowed	2 / 4m ≤10% of mid diameter	allowed
Unsound knots	not allowed	not allowed	not allowed	1 / 4m ≤10% of mid diameter	2 / 4m ≤20% of diameter, max 12cm
Covered knots	not allowed	not allowed	allowed if branch scar quotient is ≤1:4	allowed if branch scar quotient is ≤1:2 and height of scar is ≤10cm	2 / 1m
Spiral grain	not allowed	≤2cm/m	≤2cm/m	≤7cm/m	allowed
Eccentric pith	not allowed	≤10%	≤10%	≤20%	unlimited
Max sweep % L	2	3	2	3	6
Max ovality % d _s	20	unlimited	unlimited	unlimited	unlimited
Fluting	not allowed	not allowed	not allowed	not allowed	allowed
Max taper % D	3	5	4	6	10
Traversing crack	not allowed	not allowed	not allowed	allowed if length on surface is smaller then mid diameter	allowed if length on surface is smaller then double mid diameter
Simple heart crack	not allowed	not allowed	not allowed	allowed	allowed
Star crack	not allowed	not allowed	not allowed	2/3 diameter	allowed
Front crack	10cm	10cm	d _s	d _s	2d _s
Insect holes	not allowed	not allowed	not allowed	not allowed	allowed
Rot	not allowed	not allowed	not allowed	not allowed	1/4 central radius
Red heart	≤15% of diameter	≤15% of diameter	≤15% of diameter	≤33% of diameter	≤60% of diameter
Star red heart	not allowed	not allowed	not allowed	≤15% of diameter	≤40% of diameter

Feature	F1	F2	A	B	C
Wood felling damages	not allowed	not allowed	allowed, if fresh	allowed, if open	allowed, if evenly closed
Bark damages	not allowed	not allowed	not allowed	allowed in limited quantity	allowed in normal quantity
Number of defects	4	6	6	6	6

Saw Logs	Description
A	First quality timber: generally corresponding to a butt log with clear timber or with only minor features which do not restrict use.
B	Timber of average to first quality, with no specific requirements for clear wood. Knots are permitted to such an extent as is considered to be average for each species.
C	Timber of average to low quality, allowing all quality features which do not seriously reduce the natural features of the wood.
D	Timber which can be sawn into usable wood, which, because of its features, falls into none of the quality classes A, B or C.

Veneer (grades F1 and F2) is sound, straight-edged, solid wood, knotless or almost knotless as well as rose-free or almost rose-free. Tree ring construction and color should meet additional specific requirements. Minor defects are allowed in the center of the log. Minimum diameter 35cm, minimum length 2.00 m; mild wood structure, uniform, narrow growth rings.

In the case of one feature exceeding the limit of the class, which would lead to a downgrading, the reduction of length or diameter excluding the feature may allow to remain in this class.

Measurement: When measuring the length of logs, the excess length amounts to 1% of the total length, but at least 10 cm.

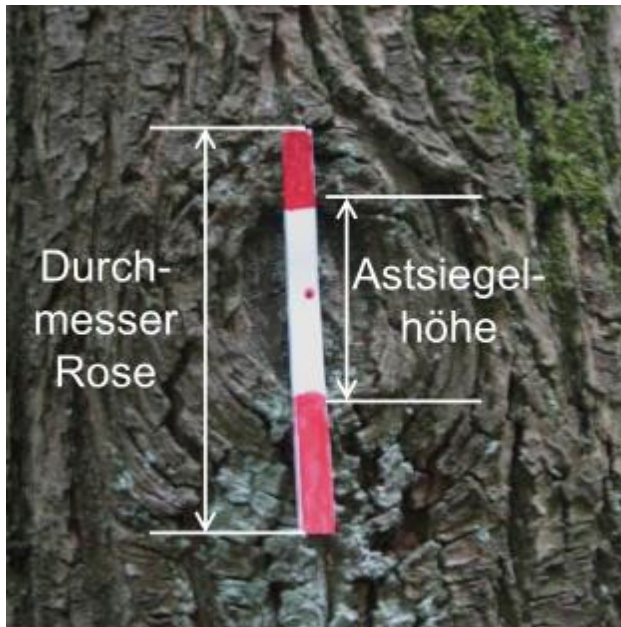
The central diameter (d) is to be measured in the middle of the log, without taking into account the excess length.

The central diameter is measured by two mutually perpendicular measurements, preferably the smallest and the largest diameter.

The diameter is rounded down to the whole centimeter.

When measuring the central diameter, a standardized bark deduction is taken into account, based on the species as follows: *Fagus Sylvatica* = 2cm

Visual explanations



Branches are called overgrown if they are not immediately visible on the outer surface of the log. Roses occur in large-barked tree species and form bark upsets around the branch seal (round scar). The delimitation of the actual branch seal from the rose becomes less clear as the duration of the overflow increases. The branch seal height (Astsiegelhöhe) is determined as half the value of the diameter in the longitudinal direction of the trunk of the outermost complete concentric bark fold of the rose, measured in centimeters. Nails are dead water sprouts with a branch seal height of less than or equal to 1 cm.



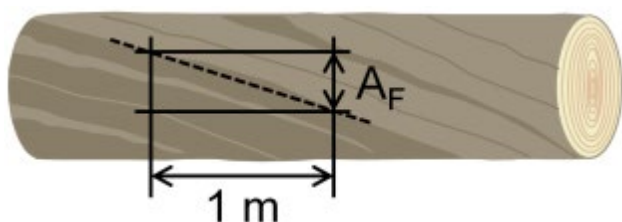
Branches without signs of rotting are to be considered as sound knots, which are visible on the outer surface of the log. The smallest diameter (D) of the branch is to be measured in centimeters close to the lateral surface. The surrounding callus is not to be considered.



Secondary branches can arise from the budding of sleeping buds. Up to a thickness of 2 cm, they are referred to as water sprouts, which can occur in groups (burls). Secondary branches over 2 cm are called adhesive branches. They can be assigned to the healthy branches, even if they differ from primary branches in terms of wood technology.



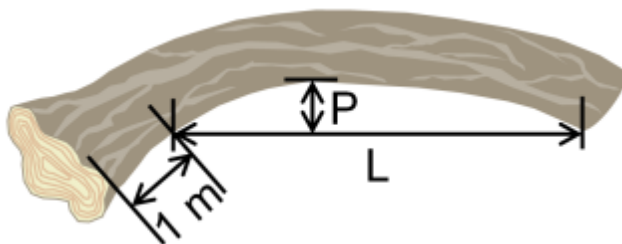
Rotten branches (unsound knots) are those with recognizable soft rot. The dimension of the rotten load is determined by measuring the narrow side of the whole branch.



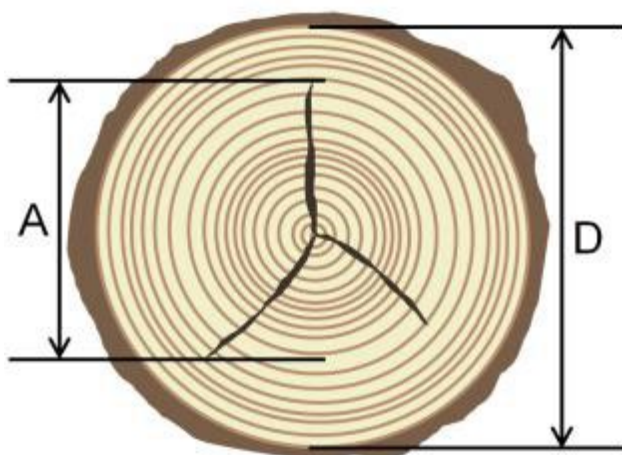
The rotation growth (spiral grain) is measured at the point of the strongest fiber inclination the lateral surface. The first length meter from the butt end is not considered. The deviation of the fiber orientation (AF) is measured from a parallel to the trunk axis in cm over 1 meter (AF in cm / m).



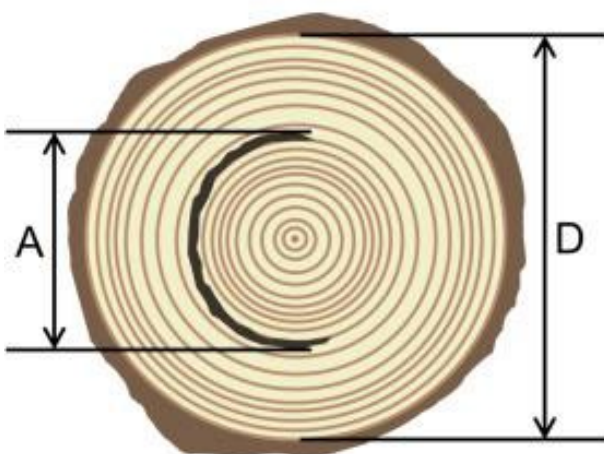
Moon rings are ring-shaped areas in the heartwood, similar to sapwood in color and properties.



The sweep is determined as the maximum distance in cm (arrow height = P) between the concave lateral surface and one of the innermost straight line connecting points of the ends (L) in meters. The specification is in cm per meter. Butt ends are measured starting at 1m from the base of the trunk.



The star shake consists of two or several cracks running in different directions. The measurement takes place by determining the greatest distance (A) between two parallels, delimiting the ends of the cracks. A is given as a fraction of the diameter D of the Face. (1) In quality class C a continuous star shake is permitted with a length twice the diameter, or maximum 1 m.

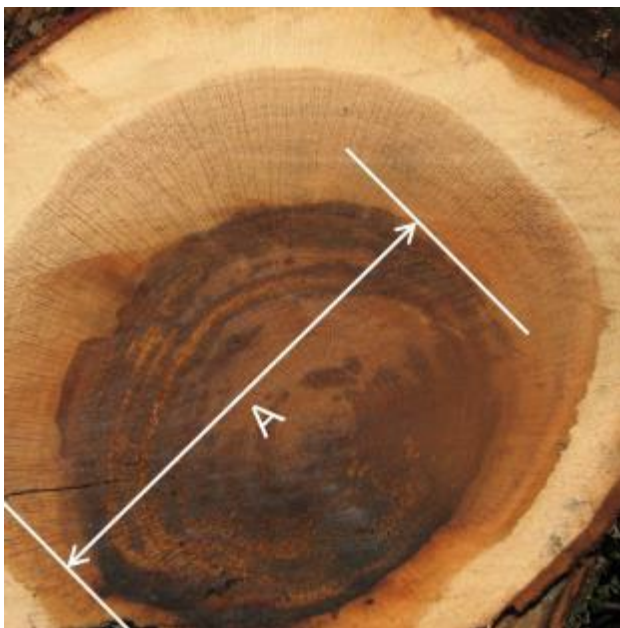


A ring shake is a crack that follows the course of a tree ring and shows up on the face.

The segment A is measured as the diameter of the circle in which the ring crack appears as an arc, expressed as a fraction of the diameter (D, without bark) of the face.



Frost shakes are longer cracks, running radially from the sapwood towards the pith. They are caused by frost on standing trees.



Rot induces the decomposition of the wood by mushrooms or others microorganisms, leading to softening and increasing loss of mass and strength. The measurement of the rot area is expressed as the greatest distance (A) between two parallel tangents of the cross section of visible rot, and is put in relation to the diameter of the assessed face.



Rotten sapwood is allowed but has to be considered by reducing the diameter applied in measurements.
It is measured on the weaker end as the largest expansion of the sapwood in radial direction.

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