Quality Requirements for Round Timber

Oak and Ash Sawlogs Quality Requirements

INTRODUCTION

The purpose of this document is to define the quality requirements for a specific round timber product – **oak and ash sawlogs**.

1. Scope

The requirements described in this document are binding for the **preparation, measurement, and quality assessment of round timber products**.

2. Normative References

The round timber quality requirements have been developed in accordance with the **regulatory acts in force in the Republic of Latvia** regarding the measurement of round timber, including the applicable Latvian national standards.

3. Terms and Definitions

The following terms and definitions apply in this document:

3.1 Working cylinder
An imaginary cylinder with a diameter equal to the **top-end diameter of the timber minus 1 cm**.

3.2 Knot
A part of a branch embedded in wood.

3.3 Rotten knot
A knot affected by decay.

3.4 Dead knot
A knot where less than ¼ of the perimeter is fused with surrounding wood.

3.5 Sound knot
A knot without signs of decay.

3.6 Spike knot (branch stub)
A knot where the ratio of the largest to the smallest cross-section diameter exceeds **4**.

3.7 Crack
Separation of wood fibres along the grain.

3.8 Pith crack
A radial end crack starting from the pith.

3.9 Drying crack
A short, narrow, and shallow crack.

3.10 Ring shake
A crack running along the annual growth ring.

3.11 Frost or lightning crack
A long radial crack caused by frost or lightning.

3.12 Curvature
Deviation of the timber longitudinal axis from a straight line.

3.13 Single curvature
Curvature with only one bend.

3.14 Multiple curvature
Curvature characterized by two or more bends.

3.15 Double pith
Two piths within the cross-section of a log end with independent annual ring systems.

3.16 Internal sapwood
A complete or incomplete ring within heartwood having the color and properties of sapwood.

3.17 Heartwood fungal damage
Damage caused by fungal or bacterial infection occurring in living trees.

3.18 Heartwood discoloration
A stage of fungal development where the color of wood changes but mechanical properties remain unchanged.

3.19 Heart rot, including cavity
A stage of fungal development where wood properties deteriorate.

3.20 Mechanical damage
Mechanical damage affecting the end or side surface of the timber.

3.21 Metal inclusions
Metal objects embedded in wood.

4. General Provisions

1. Timber must be prepared **from the living part of the stem** (considered living if more than 50% of the cross-section transports nutrients).
2. Only the **visible part of the timber** must be assessed when determining quality.
3. Rejected timber must have a **specified reason according to the defect classification**.
4. If technically possible, timber that does not meet the highest grade should have the **reason for grade reduction indicated**.
5. **Harvester feed roller marks are not considered mechanical damage**.

5. Reduction

5.1 General reduction conditions

Reduction is a **volume reduction applied when shortening the length or reducing the diameter prevents rejection or downgrade of the timber**.

Rules:

- If both length and diameter reduction are possible, the option causing **smaller volume loss** should be selected.
- Reduction must be based on defects affecting the **working cylinder or log end surface**.
- After reduction, quality must be evaluated **only on the non-reduced part of the timber**.
- Length reduction steps correspond to the **length grading specified in the measurement order**.
- Defect limits and reducible values are summarized in **Table 1 (Section 7)**.

5.2 Maximum reduction values

- Maximum length reduction per end: **12 dm**
- Maximum reduction if applied on one side: **24 dm**
- Logs with mechanical damage at the end must be reduced to the **next nominal (payment) length**
- Logs with felling or cross-cutting cracks must have a minimum reduction of **6 dm**
- Maximum diameter reduction is allowed **down to the minimum permitted diameter**

6. Measurement and Assessment of Wood Defects

6.1 Knots

6.1.1 Knot diameter

The diameter **d** of the largest knot is measured at its narrowest point **without bark**.

For sound knots, the diameter is measured **between the outer edges of the darkest annual ring**.

(Figure 1 – Knot diameter)

6.1.2 Ratio of knot diameter to stem diameter

The ratio between **knot diameter (d)** and **stem diameter (D)** at the knot location is evaluated.

(Figure 2 – Ratio of knot and stem diameters)
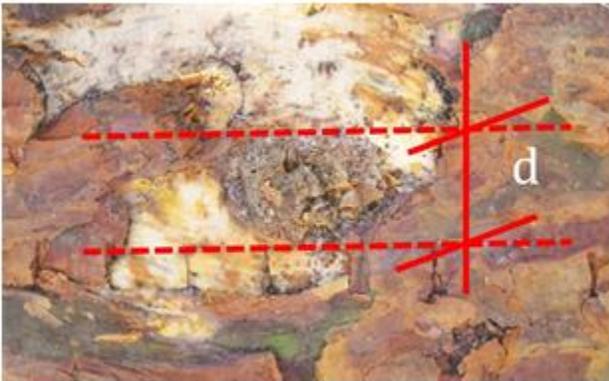
6.1.3 Loose knots

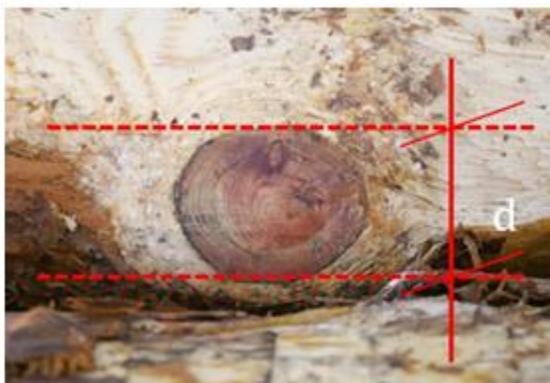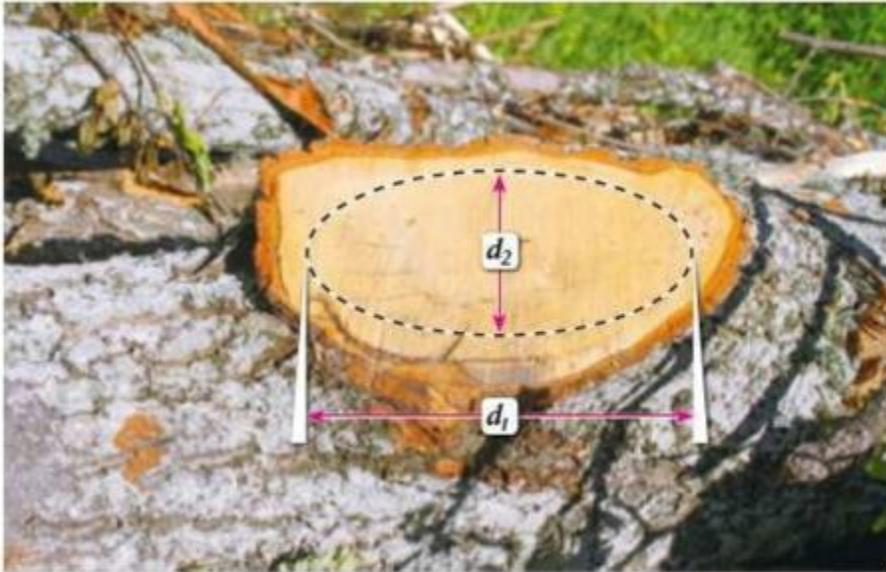Figure 3 – Rotten knot

Figure 4 – Dead knot

Figure 5 – Sound knot

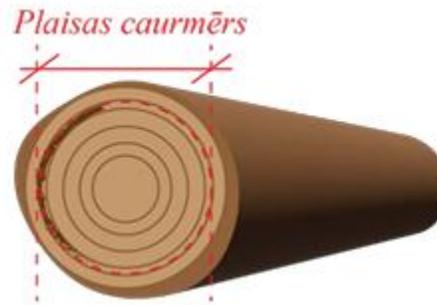6.1.4 Spike knot (branch stub)

(Figure 6 – Spike knot)

6.2 Cracks

6.2.1 Pith and drying cracks

Measure crack length on **log ends and side surfaces**.

6.2.2 Ring shake

Measure the **diameter of the cylinder affected by the crack**.

(Figure 7 – Diameter of ring shake damage)

Evaluation:
The crack-affected diameter is assessed **relative to the end surface diameter**.

6.2.3 Frost and lightning cracks

Measure crack length on **log ends and side surfaces**.
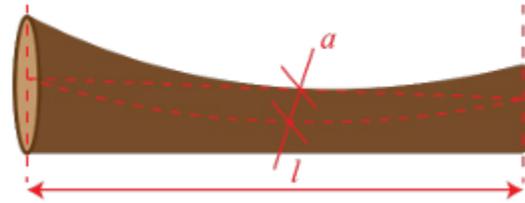
6.3 Stem Shape Defects

6.3.1 Curvature
6.3.1.1 Single curvature

The maximum deviation **a** of the longitudinal axis from a straight line is measured relative to log length **l** and expressed as a percentage.

Formula:
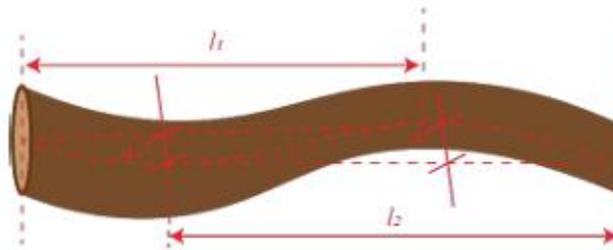
Single curvature = a / l × 100%

(Figure 7 – Single curvature)

6.3.1.2 Multiple curvature

Evaluated according to the **largest curvature indicator**.

(Figure 8 – Multiple curvature)

6.4 Wood Structure Defects

6.4.1 Double pith

Evaluate **presence of the defect**.

6.4.2 Internal sapwood

Evaluate the **diameter of unaffected internal sapwood**.
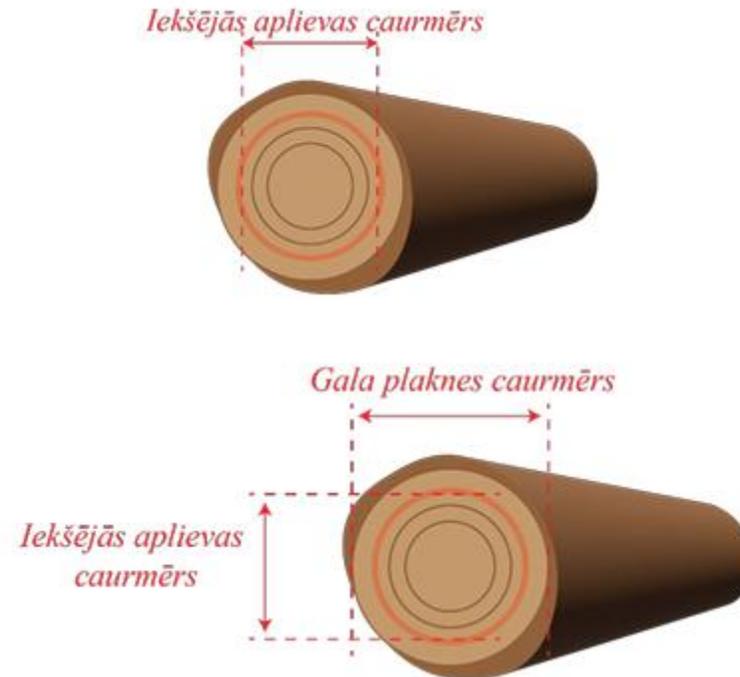
(Figures 9–10 – Internal sapwood)

6.5 Fungal Damage

6.5.1 Heartwood discoloration

Evaluate **presence of the defect**.

6.5.2 Heart rot (including cavity)

Evaluate the **ratio of rot diameter to log end diameter**.

(Figure 11 – Heart rot)

7. Defect Limits and Reducible Values

(Table 1 – Maximum allowable wood defects for oak sawlogs)

Defect Definition	Defect Name	Grade I (Max Allowed)	Grade II (Max Allowed)	Grade III (Max Allowed)	Evaluation Method	Reduction
3.2	Knots	Knot height H up to 10 cm	Knot height H up to 10 cm	Knot diameter D from 8 cm, height H up to 10 cm	6.1	None
3.3 / 3.4	Rotten knot / Dead knot	Knot diameter up to 30 mm	Knot diameter up to 1/3 of stem diameter at knot location		6.1.1	None
3.5 / 3.6	Sound knot / Spike knot	Knot diameter up to 50 mm	Knot diameter up to 1/2 of stem diameter at knot location		6.1.1 / 6.1.2	None
3.8 / 3.9	Pith / Drying crack	Crack length on both log ends up to 20 cm or crack length on one log end along side surface up to 40 cm	Same as Grade I	Allowed	6.2.1	None
3.10	Ring shake	Not allowed	Crack diameter up to 1/3 of end diameter D and/or crack width up to 10 mm; allowed if top diameter > 24 cm	Allowed	6.2.2	None
3.11	Frost and lightning crack	Not allowed	Crack length on both log ends up to 20 cm or side crack length up to 40 cm; allowed if top diameter > 24 cm	Side crack length up to 40 cm	6.2.3	None
3.13	Single curvature	Up to 3.0%	Up to 3.0%	Up to 5.0% if top diameter > 24 cm (max 6%)	6.3.1.1	Length reduction (G)
3.14	Multiple curvature	Up to 1.5%	Up to 1.5%	Up to 2.5% if top diameter > 24 cm (max 3%)	6.3.1.2	None
3.15	Double pith	Not allowed	Allowed	Allowed	6.4.1	None

3.16	Internal sapwood	Not allowed	Internal sapwood diameter + d up to 1/3 of end diameter D and/or d ≤ 10 cm	Allowed	6.4.2	None
3.18	Heartwood discoloration	Allowed	Allowed	Allowed	6.5.1	None
3.19	Heart rot (incl. cavity)	Not allowed	Up to 1/4 of end diameter D	Up to 1/4 of end diameter D	6.5.2	None
3.19	Sapwood rot	Allowed	Allowed	Rot area up to 10% of end diameter D	6.5.2	None
3.21	Metal inclusions	Not allowed	Not allowed	Not allowed	6.6.1	None
	Discoloration caused by metal inclusion	Not allowed	Allowed	Allowed		None

- **Nav** – no reduction

- **G** – length reduction

- **D** – diameter

- **H** – height