



Swedish Instructions for Timber Measurement

APPLICATION GUIDE

Measurement of Log Volume Under Bark

1 January 2019

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1. Introduction

1.1. VMK application guides for timber measurement

This application guide serves as support for interpretation of the corresponding measurement instructions (*Instruction*) set by the SDC Board. The application guides have been prepared by the Control Commission, with representatives from VMK (*Timber Measurement Control*), VMF Nord, VMF Qbera and VMF Syd. Current instructions and application guides are available on www.sdc.se under the tab 'Virkesmätning'.

1.2. Scope and application of this application guide

Instruction:

Log measurement according to the methods described in these instructions applies to all tree species and regardless of the intended use of the timber. Limits regarding log length and diameter are stated under each measurement method. Quality provisions are described in assortment-specific instructions.

Logs may be measured manually or automatically in scanners. Section measurement is primarily applicable in automatic measurement in a scanner. The scanner must be approved by VMK (Timber Measurement Control) for the application(s) concerned.

2. Log length

Instruction:

Log length is the shortest distance between the centres of each end of the log. The end centre is the centre of gravity of the end surface. In section measurement, this straight line forms the basis for dividing the log into sections.

The centre at the end of the log is the geometric centre of the end surface. The mark in the end surface showing the pith of the log is not necessarily the same as the centre of the end surface.

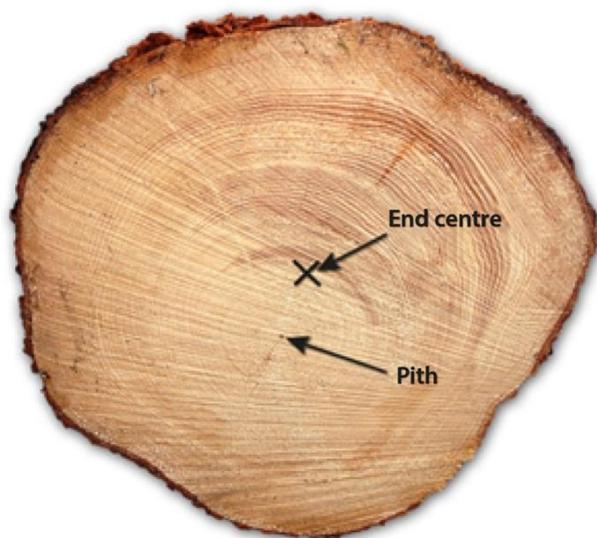


Figure 1. Log-end centre.

3. Log diameter

Instruction:

Diameter refers to the diameter of the cross-sectional area of the log under bark at the measurement point in question. In control and follow-up, manual, two-direction measurement (cross-callipering) is used as a standardised method. The diameter is measured perpendicular to the mid-line of the log.

When measurement is in one direction, this direction must be chosen at random, such as by choosing the same direction for logs placed on a hoist or measurement bench (also called 'convenient diameter measure'). If the log is distinctly oval at the measurement point, i.e. the log's largest diameter exceeds the smallest diameter by more than 10%, manual measurement must be carried out using cross-callipering.

For measurement in two directions (cross-callipering), the first direction must be chosen at random (convenient diameter measure is permitted). The second direction must be perpendicular to the first. An exception is made for a clearly oval measuring point, where cross-callipering measures the largest and smallest diameter. The diameter is then the mean of the two measurement directions.

3.1. Manual measurement

For measurement with a manual calliper, as far as possible the measurement should be taken with the log in the calliper. Otherwise there is a risk that the measurement recorded on the calliper changes when it is removed from the log.

In order to maximise accuracy in diameter measurement, the calliper should be applied with an even pressure between the jaws. The pressure must not be so great that bark between the jaws is squeezed or that there is a risk of damage to the instrument. However, the pressure must not be so slight that lichen and bark flakes between the jaws and the log significantly affect the diameter measurement. The pressure must be moderate and, above all, constant for every measurement.

Cross-calliper measurement of the diameter is always permitted. The log diameter comprises the average of the exact measurements in mm for each diameter.

When establishing the measurement point for measuring diameter, and measurement of log length, the 'folding up' procedure may not be applied.

Logs with large and sudden diameter changes caused by removal of a fork limb are regarded as logs with a closed fork. For instructions regarding these logs, see section 3.3.

3.2. Calliper measurement of convenient diameter / oval logs

When measuring logs on a measuring bench, hoist or ground, the calliper measurements should be carried out systematically. Cross-calliper measurements should preferably be taken horizontally and vertically from the ground, and single calliper measurements are taken 45 degrees from the ground. The only exception to this method is for clearly oval logs, where cross-callipering measures the largest and smallest diameter.

3.3. Measurement of logs with open and closed forks

When a log has a divided pith, this is regarded as a fork if the fork limb's diameter (d) under bark is at least one-third of the main stem's diameter (D) and at least 3 cm under bark. Diameters d and D are shown in Figure 2. If these conditions are not fulfilled, the thinner stem section is regarded as a branch.

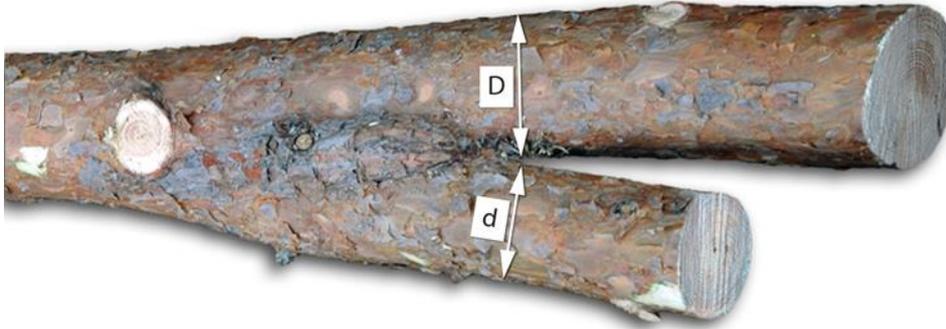


Figure 2. Diameter measurements of main stem and fork limb.

The length of the log is measured from its butt end to the smallest deliverable diameter of the fork limb that gives the longest length measurement. Fork limbs that do not extend longer than half the log length (measured from the butt end) are not included in the volume measurement (Figure 4). However, if the shorter fork limb(s) extends further than half the log length, the top diameter of the log is recorded as the measured top diameter increased by one-third (Figure 3). If a log has two or more fork limbs of equal length, the top diameter of the log is measured on the thickest fork limb. $D + D/3$ can be greater than the butt diameter.



Figure 3. Measurement of log with fork limb. Here, the shorter fork limb extends further than half the log length (measured from the butt end), so the correct diameter is $D + D/3$.



Figure 4. Measurement of log with fork limb. Here, the shorter fork limb does not extend further than half the log length (measured from the butt end), so the correct diameter is D .

The same instruction applies for determining the butt diameter of the forked log in cases where the fork begins below the measurement point. This is similar to the rule that applies when determining the top diameter of the forked log.

If the main stem is healthy, the entire log is regarded as healthy.

3.4 Adjustment for bulging

Instruction: The diameter measurement is adjusted where the stem contains bulges. This is done by not permitting increasing diameters from the butt end. At a bulge, the log is given the smallest diameter measured between the bulge and the butt end of the log.

Where there is a bulge, the diameter measurement point should be moved towards the butt end, if possible, to obtain the smallest possible diameter measurement.

4. Revision history

11 November 2014	Application Guide replaces log measurement sections in the Compendium of Timber Measurement, Part V Pulpwood, Part III General Information about Timber Measurement according to VMR 1-06, and Application Guide Measurement Instructions for Sawn Timber of Pine and Spruce / VMR 1-07. Guide adopted by Control Commission Calliper measurement of convenient diameter / oval logs. Volume measurement of sawn timber logs with forks.
1 April 2016	Smaller logo. Section 3.1. 'Folding up' not permitted.
1 August 2016	Title changed from SDC instructions to Swedish instructions. New front page. Section 3.1. "Retained measurement point" inserted. Section 3.3. Sentence before Figure 2 moved and now follows the diagram. D and d removed. "At the measurement point" added.
1 January 2017	Section 3.1. "Logs with large and sudden diameter changes..." added. Section 3.3. New heading. Final paragraph added. Figures 3 and 4 added.
1 April 2017	Section 3.3. If a log has two or more fork limbs of equal length, the top diameter of the log is measured on the thickest fork limb. $D + D/3$ can be greater than the butt diameter.
1 January 2019	Front page changed after formation of Biometria. Section 3.3. Heading: <i>Volume measurement</i> changed to <i>Measurement</i> . A fork limb must be <i>at least 3 cm under bark</i> . The length of the log is measured from its butt end to the smallest deliverable diameter of the fork limb <i>that gives the longest length measurement</i> . The two final sentences in the section are new. Section 3.4. "Adjustment for bulges" is new.