

Measuring Diameter at Breast Height and Merchantable Height

Measuring Diameter at Breast Height (d.b.h.)

Diameter measurements of standing timber are made at breast height, which is 4-1/2 feet above the ground, because this is above the swell of the base of most trees.

The two most frequently used instruments to measure tree diameter are the diameter tape and the cruising stick. The diameter tape shows tree diameter by measuring circumference. It is based on the fact that circumference of a circle is equal to the circle's diameter multiplied by 3.14. Consequently, each division on the tape is 3.14 inches apart with each division representing 1 inch in the tree's diameter. The diameter tape is wrapped around the tree at breast height, and the diameter is read directly from the tape.

The cruising stick does not measure as accurately as the diameter tape but is much faster. It is based on a system of similar triangles (identical angles but different side lengths) to determine the distances on the stick which correspond to each inch in diameter.

To use the cruising stick, hold it horizontally 25 inches from your eye (about arm's reach for the average person) against the tree at breast height (4-1/2 feet above the ground). Be sure you have the "diameter measurement" side (front) of the stick toward you and not the log scaling side (back). Line up the zero end with the outside of the tree. Then without moving your head, and using only one eye, look at the other side of the tree and read the figure nearest to where your line of sight crossed the stick and the edge of the tree. That number is the estimate of the tree's diameter at breast height. It is important to move your eye instead of your head, or your reading will not be correct. If the tree is not round, take another reading at a right angle to the first, and average the two readings.

Measuring Merchantable (Usable) Height

Individual tree height normally is measured from a 6-inch stump to a point on the stem beyond which salable sawlogs or other products cannot be cut. For sawlogs (16-foot log) the merchantable height is usually measured to a top diameter of not less than 8 inches. Cordwood (short logs - called "bolts") may be figured to about a 4-inch diameter. It is important to note that the merchantable top may occur at a point lower on the trunk than previously mentioned if merchantability is limited by forking, larger branches, or deformity.

To measure height, use that portion of the front of your cruising stick marked off as “number of 16-foot logs.”

1. Starting with your heel at the base of the tree, pace out a distance of 50 feet. Pace toward an opening which will allow you to see the tree you are measuring. Do not pace up or down hill any more than necessary, but try to stay as nearly on the same level as the base of the tree as possible.
2. Decide where the last cut will be made when the tree is cut into logs (merchantable height of the tree).
3. Hold the stick 25 inches from your eye (arm's length for the average person), but in a vertical position. Be sure the side of the stick with the “number of 16-foot logs” is toward you.
4. Move the stick up or down until the lower end is even with your line of sight to the stump height (12 inches above ground) on the tree.
5. Without moving your head, shift your vision upward to the point which you decided was the last cut of the tree. The point where your line of sight passes the stick amounts to a reading in terms of 16-foot logs. Be sure the stick is in a vertical position and not tilted forward or backward. Make your reading to the nearest half-log.

If it is necessary to go farther than 50 feet for a clear view of the tree, you may pace twice the distance and then double the reading obtained from the stick. After a little practice in timber cruising, you will find that you do not need to measure the merchantable heights of all trees. Foresters usually measure a few during a day of cruising just to “check their eye,” but most of the height estimating is done by eye rather than by measurement when tallying saw timber.