

**FOREST SERVICE HANDBOOK
PACIFIC SOUTHWEST REGION
(R5)
VALLEJO, CALIFORNIA**

**FSH 2409.11 - NATIONAL FOREST
LOG SCALING HANDBOOK
CHAPTER 10 - THEORY AND
PRINCIPLES OF SCALING**

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Approved: Randy Moore, Regional Forester

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Digest: Conducted the periodic review and converted formulas to plain language.

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12 - General Principles of Forest Service Scaling

Issue all scalers and check scalers in Region 5 who scale National Forest logs a copy of this handbook. Scalers shall follow the handbook rules as supplemented by the following instructions.

Scalers shall scale logs as they are presented according to timber sale Contract specifications. The Forest Service Representative is responsible for determining if the material presented for scaling has been bucked and removed within the terms of the Timber Sale Contract.

Scale and charge for logs or portions of logs presented for scaling which meet or exceed all the minimum piece specifications in A2 of the Timber Sale Contract. Do not alter scaling practices unless instructed in writing to do so by the Contracting Officer or Forest Service Representative.

16 - Product or Piece Specifications

The Forest Service Representative shall complete and distribute form R5-2400-53, Scaler's Information to each scaling location or scaling organization at least five days prior to the scaling of logs. This form provides contract information pertinent to the scaling of products from each timber sale. Scalers must have current Scaler's Information forms (R5-2400-53) on hand for each contract being scaled.

The Forest Service Representative shall determine if logs are being purposely bucked shorter than the contract minimum length and shall notify the Scaling

Organization or the Forest Service scaler in writing to scale such logs for payment. Scale and charge for logs with diameters below the contract minimum based on the volume determined from the point on the log where it first meets the minimum diameter, provided the remainder of the log meets or exceeds all the other minimums listed in A2 of the contract.

17 - Log Measurements

17.1 - Log Lengths

Scalers shall measure the length on as many logs as necessary for accurate length determination. Use scaler judgment to assign lengths to hidden logs which cannot be measured.

17.12 - How to Measure Lengths

Determine log length by measuring the shortest distance between the log ends; measure short side to short side. In butt logs, disregard undercuts in establishing log length.

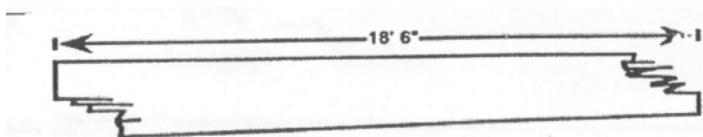
Determine lengths of logs with broken ends or evidence of breakage in one or both ends as follows:

1. On logs with both ends wholly or partially bucked, measure the length from saw cut to saw cut. Record the scaling length in even two foot multiples. Do not record or charge for overtrim or odd lengths on such logs.

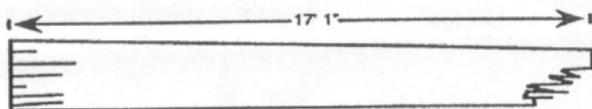
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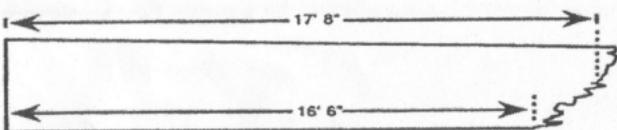


Record as an 18 foot log and make the required deduction for breakage.

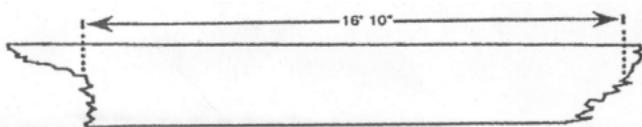


Record as a 16 foot log and make any required deduction for breakage.

2. For broken end logs with no evidence of a saw cut on one or both ends, measure from a point on the log where one-fourth or more of the scaling cylinder will produce boards of the recorded scaling length. This established length shall be in even two foot multiples.



Record as a 16 foot log and make any required deduction for breakage.



Record as a 16 foot log with no deduction for breakage.

17.17 - Log Volumes, Board Feet

Diameter factor tables for Scribner Decimal C board foot volumes published in the Official Log Scaling and Grading Rules Handbook, and used by all Scaling Organizations in the Northwestern United States, may be used in California in lieu of the volume tables published in this handbook. The volumes may vary plus or minus 10 board feet on logs of a few sizes from those listed in Appendix 2 or 3 of this handbook. The plus or minus 10 board feet variance has a balancing out effect and, over a number of logs of different sizes, has proven to be insignificant.

Volume tables based on diameter factors are also available in computers used for scaling. Upon demand the computer will print volume tables.

17.2 - Trim Allowance

See FSH 2409.11 Appendix 16.

17.3 - Log Diameters

Scalers shall measure and establish “average round log diameter” on half logs or slabs of logs split lengthwise in the following manner (also see section 45 - Special Sectional Problems):

1. When the portion of the log is definitely a half of the original round log and the approximate round log diameter can be measured, use that diameter and calculate as a round log. Take one half the calculated volume and establish the “average round log diameter”.

For example:

Log measures 16 feet times 30 inches.

Sound Original Log Gross Scale equals 660
Board Feet.

One half times log equals 330 Board Feet

“Average round log diameter” for a 16 foot log
with 330 Board Feet equals 22 inches.

Record this one half log as a 16 foot times 22
inches log. Calculate and subtract any defect
present from the 330 Board Feet gross scale.

2. When the portion of a log is almost a square:
Take a diameter on a diagonal from one
corner to the opposite and use that
measurement as the round log diameter.

For example:

A nearly square piece 16 feet long has a
diagonal measurements of 20 inches and 21
inches. The gross scale would be that of a 16
foot times 20 inches equals 208 Board Feet.

3. For pieces other than square or half-logs:
Measure the short way, then measure the long
way; and divide the total by two and use that
figure as the “average round log diameter.

For example:

A 16 foot slab measures 16 inches the short
way and 24 inches the long way, or a 20
inches average. Record this log as 16 feet
times 20 inches log having a gross scale of
280 Board Feet.

17.43 - Taper in butt Logs

The standard allowance for butt logs in Region 5, except for incense-cedar logs, is as follows:

Butt Log Scaling Length	Total Taper Allowance
21 feet to 27 feet inclusive	2 inches
28 feet to 40 feet inclusive	4 inches
41 feet to 51 feet inclusive	6 inches
over 51 feet	Determine actual taper by measuring the diameter of both ends of the log disregarding excessive butt flare, by projecting the normal taper of the log through the flared area. See exhibit 01.

The standard taper for incense-cedar butt logs is as follows:

Butt Log Scaling Length	Total Taper Allowance
21 feet to 33 feet inclusive	6 inches
34 feet to 46 feet inclusive	8 inches
47 feet to 51 feet inclusive	10 inches

Butt Log Scaling Length	Total Taper Allowance
Over 51 feet	Determine actual taper by measuring the diameter of both ends of the log disregarding excessive butt flare, by projecting the normal taper of the log through the flared area. See exhibit 01.

**17.43 - Exhibit 01 - TECHNIQUE FOR MEASURING
LARGE END OF BUTT LOGS**

1. Determine that a log is a butt log. When questionable, a log is a butt log if three of the following six conditions are identified:
 - a. Excessive flare.
 - b. Flutes.
 - c. Paint marks.
 - d. Limbs absent.
 - e. Thick bark.
 - f. Hinge.
2. Also, consider shear or circular saw marks left by mechanical fellers as a condition when logs are known to be from sales harvested by mechanical fellers.
3. Size up large end and find narrow axis.
4. Measure narrow axis and:

- a. Adjust measurement downward, if necessary, to allow for any excessive flare.
 - b. On egg-shaped logs, it may be necessary to add one or more inches to obtain the actual taper.
5. For butt logs that have extreme abnormalities such as serious cat face, excessive swell, or other conditions that do not permit proper narrow axis measurement, establish the large end diameter by measuring the small end and adding the amount of estimated taper.

When possible, verify the butt measurement by checking the diameter at the small end of the butt segment. To do this, lay the scale stick or tape across the log at the small end and read the measurement, allowing for bark thickness. This small end butt segment measurement should be very close to the diameter obtained from the proper taper rule.

When scale data is submitted for automatic data processing, the computer is programmed to allow the proper taper of each butt log on logs 21 feet to 51 feet in length. Butt logs over 51 feet in scaling length will be assigned a large end diameter based on the above techniques.