



Standard Practice for Establishing Allowable Stresses for Round Timbers for Piles from Tests of Full-Size Material¹

This standard is issued under the fixed designation D 7381; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice contains procedures for establishing allowable compression parallel to grain and bending stresses for round timbers used for piling, based on results from full-size tests.

NOTE 1—Allowable stresses for compression perpendicular to grain and shear properties are established in accordance with the provisions of Practice D 2899.

1.2 Stresses established under this practice are applicable to piles conforming to the size, quality, straightness, spiral grain, knot, shake and split provisions of Specification D 25.

1.3 A commentary on the practice is available from ASTM International.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

- D 25 Specification for Round Timber Piles
- D 198 Test Methods of Static Tests of Lumber in Structural Sizes
- D 245 Practice for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber
- D 1036 Test Methods of Static Tests of Wood Poles
- D 1990 Practice for Establishing Allowable Properties for Visually-Graded Dimension Lumber from In-Grade Tests of Full-Size Specimens

¹ This practice is under the jurisdiction of ASTM Committee D07 on Wood and is the direct responsibility of Subcommittee D07.04 on Pole and Pile Products. Current edition approved Sept. 1, 2007. Published October 2007.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

D 2555 Practice for Establishing Clear Wood Strength Values

D 2899 Practice for Establishing Allowable Stresses for Round Timber Piles

D 2915 Practice for Evaluating Allowable Properties for Grades of Structural Lumber

D 4761 Test Methods for Mechanical Properties of Lumber and Wood-Base Structural Material

D 6555 Guide for Evaluating System Effects in Repetitive-Member Wood Assemblies

3. Terminology

3.1 Definitions:

3.1.1 *allowable stress*—the numeric value of pile strength appropriate for use in design.

3.1.2 *end-bearing*—compression parallel to grain stress used in design when the pile load is not carried to the soil through skin friction.

3.1.3 *load sharing*—the distribution of load that occurs in two or more piles which are capped with a load-distributing element that assures the piles deform as a group. The load distributed to the piles in such a group is in proportion to the stiffness of each pile. This distribution of loads to the piles in the group reduces the effect of between pile variability and increases system reliability over that of piles which perform as single members.

3.1.4 *skin friction*—the interaction between the pile surface and the surrounding soil which serves to distribute load either away from or into a pile. A positive skin friction refers to pile loads distributed to the soil. Negative skin friction refers to loads being distributed into the pile as a result of soil subsidence or consolidation.

3.2 Symbols:

c = circumference of a round timber pile

C_{cp} = conditioning adjustment

C_{ds} = adjustment for duration of load and miscellaneous factor of safety

C_{ls} = load sharing adjustment

C_{oc} , C_{ob} , C_{oe} , C_{oeb} = adjustments to F_c , F_b , E and $EMOE$ for pile oversizing relative to Specification D 25 specified minimum circumferences