



Standard Guide for Design of Earthen Wall Building Systems¹

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1. Scope

1.1 This standard provides guidance for earthen building systems, also called earthen construction, and addresses both technical requirements and considerations for sustainable development. Earthen building systems include adobe, rammed earth, cob, cast earth, and other earthen building technologies used as structural and non-structural wall systems.

NOTE 1—Other earthen building systems not specifically described in these guidelines, as well as domed, vaulted, and arched earthen structures as are common in many areas, can also make use of these guidelines when consistent with successful local building traditions or engineering judgment.

1.1.1 There are many decisions in the design and construction of a building that can contribute to the maintenance of ecosystem components and functions for future generations. One such decision is the selection of products for use in the building. This guide addresses sustainability issues related to the use of earthen wall building systems.

1.1.2 The considerations for sustainable development relative to earthen wall building systems are categorized as follows: materials (product feedstock), manufacturing process, operational performance (product installed), and indoor environmental quality (IEQ).

1.1.3 The technical requirements for earthen building systems are categorized as follows: design criteria, structural and non-structural systems, and structural and non-structural components.

1.2 Provisions of this guide do not apply to materials and products used in architectural cast stone (see Specification C1364).

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.4 *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

C1364 Specification for Architectural Cast Stone
D2487 Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
E631 Terminology of Building Constructions
E2114 Terminology for Sustainability Relative to the Performance of Buildings

2.2 ASCE Standards:³

ANSI/ASCE 7 Minimum Design Loads for Buildings and Other Structures

2.3 New Zealand Standards:⁴

NZS 4297:1998 Engineering Design of Earth Buildings, 1998
NZS 4298:1998 Materials and Workmanship for Earth Buildings, 1998
NZS 4299:1998 New Zealand Standard, Earth Buildings not requiring Specific Design, 1998 (including amendment #1, December 1999)

3. Terminology

3.1 Definitions:

3.1.1 For terms related to building construction, refer to Terminology E631.

3.1.2 For terms related to sustainability relative to the performance of buildings, refer to Terminology E2114. Some of these terms are reprinted here for ease of use.

3.1.3 *alternative agricultural products, n*—bio-based industrial products (non-food, non-feed) manufactured from agricultural materials and animal by-products.

¹ This guide is under the jurisdiction of ASTM Committee E60 on Sustainability and is the direct responsibility of Subcommittee E60.01 on Buildings and Construction.

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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.

³ Available from American Society of Civil Engineers (ASCE), 1801 Alexander Bell Dr., Reston, VA 20191, <http://www.asce.org>.

⁴ Available from Standards New Zealand, Ministry of Business, Innovation & Employment, 15 Stout Street, Wellington 6011, <http://www.standards.govt.nz>.